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(54) Title: INTERACTIVE PROGRAM GUIDE WITH CONTINUOUS DATA STREAM AND CLIENT-SERVER DATA SUPPLEMENTATION

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(57) Abstract

An interactive television program guide system is provided. An interactive television program guide implemented on user television equipment obtains program guide data from two data delivery mechanisms. Current program guide data is obtained from a continuous data stream. Other program data (which may include the current program guide data) is obtained by the program guide from a program guide server. The continuous data stream may also include program and program grouping identifiers. The program guide may perform real-time actions associated with program identified in the continuous data stream.

(57) Abrégé

L'invention concerne un système de guide de programme de télévision interactive. Un guide de programme de télévision interactif mis en oeuvre sur un équipement de télévision pour usager reçoit des informations de guide de programme à partir de deux mécanismes fournisseurs d'informations. Les données pour guide de programme courant sont obtenues à partir d'un flux d'informations continu. D'autres informations pour guide de programme (pouvant inclure les informations pour guide de programme courant) sont obtenues par le guide de programme à partir d'un serveur des guides de programme. Le flux d'informations continu peut également comprendre des identificateurs de programmes et des identificateurs de groupement de programmes. Le guide de programme peut effectuer des actions en temps réel associées aux programmes identifiés dans le flux d'informations continu.

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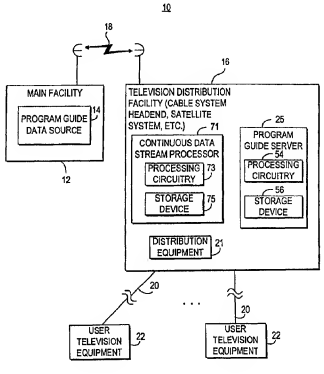
An interactive television program guide system is provided. An interactive television program guide implemented on user television equipment obtains program guide data from two data delivery mechanisms. Current program guide data is obtained from a continuous data stream. Other program data (which may include the current program guide data) is obtained by the program guide from a program guide server. The continuous data stream may also include program and program grouping identifiers. The program guide may perform real-time actions associated with program identified in the continuous data stream.



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Description

INTERACTIVE PROGRAM GUIDE WITH CONTINUOUS DATA STREAM AND CLIENT-SERVER DATA SUPPLEMENTATION

Background of the Invention

This invention relates to interactive television program guide systems, and more particularly, to interactive television program guide systems in which an interactive television program guide obtains program guide data using two data delivery mechanisms.

Cable, satellite, and broadcast television systems provide viewers with a large number of television channels. Users have traditionally consulted printed television program schedules to determine the programs being broadcast at a particular time. More recently, interactive television program guides have been developed that allow television program information to be displayed on a user's television. Interactive television program guides, which are typically implemented on set-top boxes, allow the user to navigate through television program

listings using a remote control. In a typical program guide, various groups of television program listings are displayed in predefined or user-selected categories. Program listings are typically displayed in a grid or table.

How program listings data is delivered to the program guide may impact overall system performance and the amount of hardware needed at the user's home. One known data delivery approach involves providing a continuous "trickle" data stream of program guide data to the set-top boxes of a number of users, typically on an out-of-band channel. The program guide stores a local copy of the program guide data provided in the continuous data stream. This approach has a number of advantages. Maintaining a local copy of the program guide data at the set-top box allows the program guide to function even if the program guide does not have access to the data stream for an extended period of time. Program guide data is also available to the program guide with no latency. In addition, multiple local data feeds are unnecessary because the program guide can filter its local channel lineup from a single national data feed.

However, this approach requires a significant amount of memory in the set-top box. If an in-band data channel is used, the guide must tune to a channel carrying the data at a regular interval, possibly preventing the user from watching television during that time. If an out-of-band channel is used, a significant amount of time may be required to initially populate the database of program guide data maintained in the set-top box.

In a known Digital Satellite Services (DSS) system, multiple high-speed feeds of various subsets of program guide data are provided to the program guide. This approach suffers from a number of deficiencies. A significant amount of local memory is required to store the data in the satellite receiver, and the program guide or the satellite receiver must still discard some data when the program guide needs to acquire additional data from one of the feeds. There is a delay when the program guide tunes to and acquires such additional data from a particular feed. The high-speed feeds may also not be formatted to allow all types of searches and sorts on the data.

Another type of satellite system has been proposed in which a combination of a trickle feed and high-speed feeds is used to provide program guide data to the program guide. This approach also requires a significant amount of local memory for storing the program guide data. The system also incurs a delay when the program guide acquires data from different streams.

In a client-server based approach, all of the program guide data may be stored on a remote server that handles program guide data requests from a number of program guides (clients). This approach allows complex requests to be handled with a powerful server rather than a cost-sensitive client device. However, there may be delays associated with accessing the server, especially during times of peak usage. This may result in delays in fundamental operations, such as channel changing. Also, because no data is stored locally by the program guide, the program guide becomes

non-functional if the connection to the server is broken.

It is therefore an object of the present invention to provide an interactive televison program guide system in which the program guide may obtain program guide data using multiple data delivery mechanisms and thereby provide a robust system in which the amount of memory required for the user's home program guide equipment and the latency for accessing program guide data are minimized.

Summary of the Invention

This and other objects of the present invention are accomplished in accordance with the principles of the present invention by providing an interactive television program guide system in which program guide data is obtained by an interactive program guide from a continuous stream of program guide data and from a program guide server.

A main facility provides program guide data to a television distribution facility. The television distribution facility provides some of the program guide data (e.g., current program listings data which may include data for program listings for the current time slot and for the next few hours) over a continuous data stream to a number of program guides. Each program guide is implemented on user television equipment associated with a user. The television distribution facility also stores program guide data in a program guide server and provides the stored program guide data to the program guides using a client-server arrangement.

The television distribution facilities may also transmit program and program grouping identifiers (e.g., identifiers for series, mini-series, orderable packages of programs, etc.) in the continuous data stream. The program guides may perform real-time actions associated with programs identified in the continuous data stream.

This approach has a number of advantages over other known systems. For example, the cost of the user's television equipment may be reduced because the memory requirements of the television equipment are minimized. In addition, current data which is needed frequently is available more quickly because a connection to a remote server need not be established before the data is obtained, as is required with a pure client-server approach. By sending frequently-used data in a broadcast stream, the total number of required network connections and the total amount of data to be transferred may be reduced. This may significantly reduce the total network load associated with the television distribution facility.

The program guide server may perform complicated searches and sorts. This may reduce the computational demands placed on the user television equipment and may relieve the user television equipment of the burden of performing database management tasks. In addition, by delivering program guide data using two separate data delivery mechanisms, a robust system may be provided in which some program guide data may still be obtained by the program guide even if the communications line used by one of the delivery mechanisms is interrupted.

Further features of the invention, its nature and various advantages will be more apparent from the accompanying drawings and the following detailed description of the preferred embodiments.

Brief Description of the Drawings

FIG. 1 is a schematic block diagram of an illustrative system in accordance with the principles of the present invention.

FIG. 2 is a schematic block diagram of illustrative user television equipment in accordance with the principles of the present invention.

FIG. 3 is a generalized schematic block diagram of portions of the illustrative user television equipment of FIG. 2.

FIG. 4 shows an illustrative main menu screen in which selectable program guide options are displayed for the user.

FIGS. 5a and 5b show illustrative display screens in which program listings are displayed by time and by channel, respectively.

FIG. 6 shows an illustrative additional program information screen.

FIG. 7 shows an illustrative program listings by category screen in which program listings are displayed for a particular category.

FIG. 8a shows an illustrative FLIP display that may be displayed when the user changes channels.

FIG. 8b shows an illustrative BROWSE display that may be displayed when the user indicates a desire to browse through program listings for a given time slot.

FIGS. 9a and 9b show illustrative reminder set-up and confirmation overlays, respectively.

FIGS. 10a and 10b show illustrative reminder lists.

FIG. 11a shows an illustrative pay-per-view program listings display screen.

FIG. 11b shows an illustrative pay-per-view ordering overlay.

FIG. 11c shows an illustrative pay-per-view order confirmation overlay.

FIG. 11d shows an illustrative overlay in which the program guide indicates to the user that a particular pay-per-view program has been ordered and provides the user with the opportunity to cancel the duplicate order.

FIG. 11e shows an illustrative overlay in which the program guide indicates to a user that a particular pay-per-view program has started and provides the user with the opportunity to order it anyway.

FIGS. 12a and 12b show illustrative display screens in which the program guide indicates to the user that an ordered pay-per-view program is starting.

FIGS. 13a and 13b show illustrative windows in which the program guide indicates to the user that the user has missed an ordered pay-per-view program.

FIGS. 14a and 14b show illustrative overlays that may be displayed by the program guide to provide a user with the opportunity to confirm the recording of a program.

FIGS. 15a and 15b show illustrative parental control overlays that the program guide may display

when a user indicates a desire to lock a program or access a locked program, respectively.

FIG. 16 is an illustrative flowchart of steps involved in obtaining program guide data with the program guide from two data delivery mechanisms in accordance with the principles of the present invention.

FIG. 17 is an illustrative flowchart of steps involved in providing a user with program listings data and additional program information using the program guide in accordance with the principles of the present invention.

FIG. 18 is an illustrative flowchart of steps involved in performing real-time actions associated with a showing of a program in accordance with the principles of the present invention.

FIGS. 19a-19c show illustrative data flow diagrams of three embodiments of the interactive program guide system of the present invention in which the program guide performs real-time actions based on identifiers transmitted in a continuous data stream.

Detailed Description of the Preferred Embodiments

An illustrative interactive television program guide system 10 in accordance with the present invention is shown in FIG. 1. Main facility 12 provides program guide data from program guide data source 14 to television distribution facility 16 via communications link 18. There are preferably numerous television distribution facilities 16, although only one such facility is shown in FIG. 1 to avoid over-complicating the drawing. The program guide data transmitted by main facility 12 to television

distribution facility 16 may include television program listings data (e.g., program times, channels, titles, and descriptions) and other program guide data for additional services other than television program listings (e.g., additional program information, pay-per-view ordering information, weather information, news information, associated Internet web links, advertisement graphics, videos, etc.). The program guide data may also include unique identifiers for each showing of each program, identifiers for program groupings (e.g., series, mini-series, orderable packages of programs, etc.), or any other suitable identifier.

Link 18 may be a satellite link, a telephone network link, a cable or fiber optic link, a microwave link, an Internet link, a combination of such links, or any other suitable communications link. If it is desired to transmit video signals over link 18 in addition to data signals, a relatively high bandwidth link such as a satellite link may generally be preferred to a relatively low bandwidth link such as a telephone line. Television distribution facility 16 may be any suitable distribution facility (e.g., a cable system headend, a broadcast distribution facility, a satellite television distribution facility, or any other suitable type of television distribution facility). Television distribution facility 16 may distribute the program guide data that it receives from main facility 12 to multiple users over communications paths 20 using distribution equipment 21.

Distribution equipment 21 may be any combination of hardware and software suitable for distributing program guide data to user television

equipment 22. Distribution equipment 21 may include, for example, suitable transmission hardware for distributing program guide data on a television channel sideband, in the vertical blanking interval of a television channel, using an in-band digital channel, using an out-of-band digital signal, or by any other suitable data transmission technique. Video signals (e.g., television programming) may also be provided by distribution equipment 21 to user television equipment 22 over communications paths 20 on multiple television channels.

Communications paths 20 may be any communications paths suitable for distributing program guide data in a continuous data stream and using a client-server approach. Communications paths 20 may include, for example, a satellite link, a telephone network link, a cable or fiber optic link, a microwave link, an Internet link, a data-over-cable service interface specification (DOCSIS) link, a combination of such links, or any other suitable communications link.

Television distribution facility 16 may have program guide server 25. Program guide server 25 may be based on any suitable combination of server software and hardware. Program guide server 25 may retrieve program guide data from storage device 56 in response to program guide data requests generated by interactive television program guides implemented on user television equipment 22. As shown in FIG. 1, program guide server 25 may include processing circuitry 54 and storage device 56. Processing circuitry 54 may include any suitable processor, such as a microprocessor or group of microprocessors, and other processing circuitry such as caching circuitry, direct memory

access (DMA) circuitry, input/output (I/O) circuitry, etc. Storage device 56 may be a memory or other storage device, such as random access memory (RAM), read only memory (ROM), flash memory, a hard disk drive, etc., that is suitable for storing the program guide data transmitted to television distribution facility 16 by main facility 12. Program guide data may be stored on storage device 56 in any suitable format (e.g., a Structured Query language (SQL) database).

Processing circuitry 54 may process requests for program guide data by searching the program guide data stored on storage device 56 for the requested data, retrieving the data, and providing the retrieved data to distribution equipment 21 for distribution to user television equipment 22. Alternatively, program guide server 25 may transmit program guide data to user television equipment 22 directly. If communications paths 20 include an Internet link, DOCSIS link, or other high speed computer network link (e.g., 10BaseT, 100BaseT, 10BaseF, T1, T3, etc.), for example, processing circuitry 54 may include circuitry suitable for transmitting program guide data and receiving program guide data requests over such a link.

Program guide server 25 may communicate with user television equipment 22 using any suitable communications protocol. For example, program guide server 25 may use a communications protocol stack that includes transmission control protocol (TCP) and Internet protocol (IP) layers, sequenced packet exchange (SPX) and internetwork packet exchange (IPX) layers, or any other suitable layer or combination of layers. User television equipment 22 may also include

suitable hardware for communicating with program guide server 25 over communications paths 20 (e.g., Ethernet cards, modems (digital, analog, or cable), etc.)

The program guide on user television equipment 22 may retrieve program guide data from program guide server 25 using any suitable client-server based approach. The program guide may, for example, pass SQL requests as messages to program guide server 25. In another suitable approach, the program guide may invoke remote procedures that reside on program guide server 25 using one or more remote procedure calls. Program guide server 25 may execute SQL statements for such invoked remote procedures. In still another suitable approach, client objects executed by the program guide may communicate with server objects executed by program guide server 25 using, for example, an object request broker (ORB). This may involve using, for example, Microsoft's Distributed Component Object Model (DCOM) approach.

Program guide server 25 may also store program videos, video clips, or audio clips on storage device 56. The videos or clips may be distributed to user television equipment 22 using any suitable video-on-demand ("VOD") or near-video-on-demand ("NVOD") approach. Program guide server 25 may, for example, receive video requests from user television equipment 22 over communications paths 20, retrieve the requested videos from storage device 56 and pass the retrieved videos to distribution equipment 21 for distribution to user television equipment 22. Program guide server 25 may, for example, store videos as Moving Pictures Experts Group (MPEG) MPEG-2 files on storage device 56. Processing circuitry 54 of program guide server 25 may

include, for example, circuitry suitable for converting the stored MPEG-2 files into National Television Standards Committee (NTSC) video for distribution by distribution equipment 21.

In another suitable approach, program guide server 25 may transmit the videos directly to user television equipment 22 over communications path 20 as, for example, an MPEG data stream. In this approach, user television equipment 22 may include, for example, suitable hardware and software for receiving and decoding the MPEG data stream and displaying the videos for the user.

Television distribution facility 16 may have multiple program guide servers 25 but only one program guide server 25 has been drawn to avoid over-complicating the drawing. If television distribution facility 16 has multiple program guide servers 25, each of the program guide servers may be assigned a different group of users and process that group's requests for program guide data. Alternatively, different program guide servers 25 may be responsible for processing requests for different types of program guide data for all users. One program guide server 25 may, for example, process requests for program listings information and another may process requests for videos. In still another suitable approach, multiple program guide servers 25 may share the burden of processing requests using a suitable dynamic load sharing approach.

If desired, some of the program guide servers 25 associated with a particular television distribution facility may be deployed at various network nodes within the distribution network (depicted

as communications paths 20) for that television distribution facility. Program guide servers 25 may also be Web or other types of Internet servers located outside of television distribution facility 16. To simplify the present discussion, such servers may be treated as though they are located at television distribution facility 16.

Television distribution facility 16 may also have continuous data stream processor 71. Continuous data stream processor 71 may be based on any combination of software and hardware suitable for selecting a portion of the program guide data provided by main facility 12 for inclusion in a continuous data stream transmitted to user television equipment 22. Continuous data stream processor 71 has been shown as separate from program guide server 25, but the two systems may be combined if desired.

Continuous data stream processor may, for example, have processing circuitry 73 and optional storage device 75. Processing circuitry 73 may include any suitable processor, such as a microprocessor or group of microprocessors, and other processing circuitry such as cashing circuitry, direct memory access (DMA) circuitry, input/output (I/O) circuitry, etc. Optional storage device 75 may be a memory or other storage device, such as a random access memory (RAM), read only memory (ROM), flash memory, a hard disk drive, etc., that is suitable for storing program guide data.

Continuous data stream processor 71 may obtain program guide data for the continuous data stream using any suitable approach. Main facility 12 may, for example, periodically transmit program guide

data for the continuous data stream to television distribution facility 16 where it may be stored by continuous data stream processor 71. Alternatively, program guide data may be transmitted continuously by main facility 12 to television distribution facility 16 and distributed by continuous data stream processor 71. The data may be received by television distribution facility 16 and provided to continuous data stream processor 71 or, the data may be received directly by continuous data stream processor 71 without passing through television distribution facility 16 (e.g., when continuous data stream processor 71 is not located in television distribution facility 16). Alternatively, program guide server 25 may store program guide data on storage device 56 and provide program guide data to continuous data stream processor 71. Program guide server 25 may provide program guide data to continuous data stream processor 71 continuously, periodically, in response to requests from continuous data stream processor 71, using a polling scheme, or using any other suitable approach.

If necessary, continuous data stream processor 71 or program guide server 25 may localize the program guide data received from main facility 12. Localization of the program guide data is accomplished by extracting program guide data for channels and services that are provided by a particular television distribution facility 16 and discarding the rest of the data. Localization may also involve making local changes to the data (e.g., changing channel names to local channel names). Continuous data stream processor 71 or program guide server 25 may store all of the

received data or only data that is required locally (e.g., the extracted data).

Alternatively, continuous data stream processor 71 may continuously filter program guide data that is not of interest locally out of a continuous data stream provided by main facility 12. Continuous data stream processor 71 may also, for example, prioritize program guide data by assigning the frequency with which different types of program guide data will be cycled in the continuous data stream. After continuous data stream processor 71 obtains program guide data for the continuous data stream (e.g., from main facility 12 or program guide server 25), and assigns priorities to the different types of data, it passes the data to program guide distribution equipment 21 for distribution. Distribution equipment 21 may, for example, modulate the data onto an out-of-band channel in cycles according to the assigned priorities.

The interactive program guide obtains program guide data in two different ways. First, program guide data is retrieved by the program guide from the continuous data stream of program guide data that is transmitted by television distribution facility 16 to user television equipment 22 over communications path 20. In order to reduce the total bandwidth required by the continuous data stream, the program guide data transmitted as part of the continuous data stream is limited to the subset of the program guide data selected by continuous data stream processor 71. In particular, the subset of program guide data may be current program guide data (i.e., data related to programs that are currently being broadcast or that are

scheduled to be broadcast in the next few hours). The continuous data stream may include, for example, the channel number or other unique identifier for each channel, the call letters of each channel, the start and end time and data for the current program on each channel, the start and end time and data for the next few upcoming programs on each channel, current and upcoming program titles, current and upcoming program ratings, current and upcoming program categories, a unique identification number related to the specific showing of a specific program, or any suitable combination thereof.

The continuous data stream may, for example, carry program listings data for all channels in the current time slot, for all channels in the current time slot and for the next few hours, or for any other suitable combination of program listings. The amount of program listings data carried in the continuous data stream may be limited by the bandwidth allocated to the data stream based on the practiced transmission scheme, or by the amount of other types of program guide data carried by the continuous data stream.

The information in the continuous data stream should be cycled at a fairly high rate so that the latency to access any particular item of data in the data stream is minimal, preferably a fraction of a second. If desired, the data may be processed by the program guide substantially in real-time with minimal or no data caching. Even if a significant amount of data caching is involved, the program guide need never store a significant amount of the data from the continuous data stream in the set-top box. Moreover,

the program guide need not maintain a local database of data from the continuous data stream.

If desired, hardware filtering circuitry may be provided in user television equipment 22. This allows hardware filtering to be used to ease the processing burden imposed on the program guide. Program guide data for each channel may be transmitted in the continuous data stream and tagged, for example, with a channel identifier. Channel-by-channel, the program guide may load a filter register in the user television equipment with the ID of a channel of interest, so that the user television equipment may filter out the data for all other channels from the continuous data stream.

The program guide may prefetch data from the continuous data stream to minimize data access latency and thereby allow program guide data to be cycled less often. The program guide may prefetch data based on predictions of what data a user is likely to need, and when performing any function that accesses the continuous data stream. For example, if a user is browsing through program listings, the program guide may prefetch listings from the continuous data stream for the next time slot in the browse. Program listings and other information may, for example, be prefetched for a higher or lower channel when the user flips channels. If the program guide provides the user with the ability to tune to the last channel, the program guide may prefetch or cache already retrieved information for the most recently tuned channel. If, for example, the program guide provides the user with the opportunity to tune to favorite channels, the program guide may prefetch data from the continuous

data stream for the next and the previous favorite channels. In still another suitable approach, the program guide may prefetch program guide data as a user enters a channel number on, for example, remote control 40. For example, when a user enters a "2", the program guide may prefetch data for channels 2, 20-29, 200-299, etc. When a user enters the next digit, for example, a "3", the program guide may prefetch the data for channels 23, 230-239, etc. This list of approaches is only illustrative. Prefetching may be performed by the program guide for any function that requires data from the continuous data stream.

Different types of data in the continuous data stream may be sent at different rates (e.g., based on priorities assigned by continuous data stream processor 71). For example, call letters and the data related to the current program may be repeated twice each second or faster, while the data related to the upcoming program may be sent on the order of once each second. These repetition rates are merely illustrative. If desired, other repetition rates may be used. For example, data relating to the current program may be provided at a rate greater than twice per second (such as ten times per second).

Distribution equipment 21 preferably distributes the continuous stream of current data to user television equipment 22 out-of-band so that the program guide data is continuously available to the program guide. Alternatively, program guide data may be transmitted in-band over a dedicated analog channel, in the vertical blanking interval of a number of analog channels, or using any other suitable approach. If the continuous data stream is transmitted in-band over

multiple channels, it may, for example, contain only data associated with the channel in which it is transmitted.

The continuous data stream may also be transmitted as one or more digital data tracks on one or more digital channels. One suitable approach may involve multiplexing different groups of digital channels onto different analog channels and transmitting a continuous digital data stream for each group. Another suitable approach may involve distributing programmer provided in-band information (e.g., Program and System Information Protocol for Terestrial Broadcast and Cable (PSIP) information, Digital Video Broadcast (DVB) System Information (SI), etc.). This approach may eliminate the need for continuous data stream processor 71.

It may also be desirable for television distribution facility 16 to distribute multiple continuous data streams. Each continuous data stream may, for example, correspond to different types or categories of program guide data. Each continuous data stream may, for example, carry data for creating different popular program guide display screens (e.g., one stream may carry listings for the current hour, one stream may carry listings for movies, etc.). It may also be desirable, for example, to distribute a continuous data stream of program listings for each menu option of a main menu screen.

The second way that the interactive program guide implemented on user television equipment 22 obtains program guide data is from program guide server 25 using client-server techniques. Program guide server 25 may store program guide data in any

suitable format, such as in the form of a SQL database. The interactive program guide may obtain program guide data from program guide server 25 by, for example, invoking a remote procedure call on program guide server 25, issuing messages or requests, or using suitable object based communications (any suitable combination of which are hereafter collectively referred to as "requests") via communications path 20. Program guide server 25 may process requests by querying storage device 56 for program guide data that satisfies the request. Program guide server 25 retrieves the requested program guide data from storage device 56. Distribution equipment 21 may distribute the retrieved data over one of communications paths 20 to the particular program guide that generated the request using, for example, an Internet-based addressing scheme. Alternatively, program guide server 25 may distribute the program guide data to user television equipment 22 directly over the communications path 20.

Program guide server 25 may reduce the time needed to access the program guide data using any suitable approach. Program guide server 25 may, for example, extract data needed to construct each of the most popular program guide display screens ahead of time and provide this pre-extracted data in response to requests. Program guide server 25 may also, for example, perform any necessary database joins required to build one or more intermediate tables of program guide data. This may relieve user television equipment 22 of the processing burden associated with such tasks.

In addition, configuration information and user settings (e.g., favorite channel settings and the like) may be stored by user television equipment 22 or by program guide server 25. Frequently accessed settings are preferably stored by user television equipment 22, but may be prefetched based on a prediction by the program guide of the user's next likely action.

An illustrative arrangement for user television equipment 22 is shown in FIG. 2. Receiver 55 receives television programming and data from television distribution facility 16 (FIG. 1) at input 26. Receiver 55 may be based on any suitable hardware and software for receiving program guide data and television programs. During normal television viewing, tuner 51 of set-top box 28 tunes to a desired television channel based on inputs from the user on remote control 40. Tuner 51 may be based on any suitable hardware and software for tuning to analog or digital television channels.

Multiple tuners may be provided, but only one has been shown to avoid over-complicating the drawing. If multiple tuners are provided, the user's viewing (or playing) of a program may not be interrupted when the program guide obtains data. If, for example, program guide data is provided in-band on a dedicated analog channel, one tuner 51 may tune to an analog channel carrying television programming while another tuner 51 may tune to the dedicated channel. Alternatively, one tuner may be used to access the continuous data stream, and another to access program guide server 25. Program guide systems that use multiple tuners to obtain in-band data are described, for example, in concurrently

filed Ellis U.S. patent application Serial No. 09/330,860. By using multiple tuners, the program guide may access program guide data without interrupting the display of television programming.

If user television equipment 22 has only a single tuner 51, television viewing may be interrupted when tuner 51 tunes to a separate channel to obtain in-band data (if provided on a dedicated channel, or, for example, when the user browses through channels) or data from program guide server 25. It may be desirable, therefore, to provide graphics, audio, or, video, in the continuous data stream that may be displayed or played by the program guide when the program guide obtains data not carried in-band on the channel the user is watching. If user television equipment 22 has multiple tuners, graphics, audio, or video carried in the continuous data stream may be displayed or played while the program guide obtains data from, for example, program guide server 25 or an in-band data stream on another channel.

The signal for the television channel to which tuner 51 is tuned is provided at video output 30. The signal supplied at output 30 is typically either a radio-frequency (RF) signal on a predefined channel (e.g., channel 3 or 4), or a analog demodulated video signal, but may also be a digital signal provided to television 36 on an appropriate digital bus (e.g., a bus using the Institute of Electrical and Electronics Engineers (IEEE) 1394 standard). The video signal at output 30 may be received by optional secondary storage device 32.

Set-top box 28 may also include communications device 27 for transmitting requests to

program guide server 25 over request communications path 70. Communications device 27 may be, for example, a modem (e.g., any suitable analog digital telephone dialup modem, or a cable modem), network interface card (e.g., an Ethernet card), or any other device suitable for transmitting requests to program guide server 25. Request communications path 20 is preferably a return-path on communications path 20, but may be a separate suitable communications path.

Secondary storage device 32 can be any suitable type of analog or digital program storage device or player (e.g., a videocassette recorder, a digital video disc (DVD) player with recording capabilities, etc.). Program recording and other functions may be controlled by set-top box 28 using control path 34. If secondary storage device 32 is a videocassette recorder, for example, a typical control path 34 involves the use of an infrared transmitter coupled to the infrared receiver in the videocassette recorder that normally accepts commands from a remote control such as remote control 40. Remote control 40 may be used to control set-top box 28, secondary storage device 32, and television 36.

The interactive television program guide may run on set-top box 28, on television 36 (if television 36 has suitable processing circuitry and memory), or on a suitable analog or digital receiver connected to television 36. The interactive television program guide may also run cooperatively on both television 36 and set-top box 28. Interactive television application systems in which a cooperative interactive television program guide application runs on multiple devices are described, for example, in Ellis U.S. patent

application Serial No. 09/186,598, filed November 5, 1998, which is hereby incorporated by reference herein in its entirety.

If desired, set-top boxes 28 may be used that contain digital storage devices such as digital storage device 31 that allow the user to record programs and program data in digital form. Digital storage device 31 may be a writeable optical storage device (such as a DVD player capable of handling recordable DVD discs), a magnetic storage device (such as a disk drive or digital tape), or any other digital storage device. Interactive television program guide systems that have digital storage devices are described, for example, in Hassell et al. U.S. patent application Serial No. 09/157,256, filed September 17, 1998, which is hereby incorporated by reference herein in its entirety.

Digital storage device 31 can be contained in set-top box 28 or it can be an external device connected to set-top box 28 via an output port and an appropriate interface. If necessary, processing circuitry in set-top box 28 may be used to format the received video, audio, and data signals into a digital file format. The file format may be an open file format such as the Moving Pictures Expert Group (MPEG) MPEG-2 standard. The resulting data may be passed to digital storage device 31 via an appropriate bus (e.g., a bus using the Institute of Electrical and Electronics Engineers (IEEE) 1394 standard) and may be stored on digital storage device 31.

Television 36 receives video and audio signals from secondary storage device 32 via communications path 38. The signals on communications path 38 may either be generated by secondary storage

device 32 when playing back a prerecorded storage medium (e.g., a videocassette or a recordable digital video disc), by digital storage device 31 when playing back a prerecorded digital medium, may be passed through from set-top box 28, may be provided directly to television 36 from set-top box 28 if secondary storage device 32 is not included in user television equipment 22, or may be received directly by television 36. During normal television viewing, the signals provided to television 36 correspond to the desired channel to which the user has tuned with set-top box 28. The signals may also be provided to television 36 by set-top box 28 when set-top box 28 is used to play back information stored on digital storage device 31.

A more generalized embodiment of user television equipment 22 of FIG. 2 is shown in FIG. 3. As shown in FIG. 3, program guide data from television distribution facility 16 (FIG. 1) is received by control circuitry 42 of user television equipment 22. The functions of control circuitry 42 (e.g., obtaining program guide data from the continuous stream of current program guide data, obtaining program guide data from program guide server 25, generating program guide display screens, program recording, etc.) may be provided using the set-top box arrangement of FIG. 3. Alternatively, these functions may be integrated into an advanced television receiver, personal computer television (PC/TV), a personal computer with a television tuner card, or any other suitable arrangement. If desired, a combination of such arrangements may be used.

Control circuitry 42 may include any suitable processor, such as a microprocessor, and suitable support circuitry such as caching circuitry, direct memory access (DMA) circuitry, input/output (I/O) circuitry, etc. Control circuitry 42 may include memory 44. Memory 44 may be any memory or other storage device, such as a random access memory (RAM), read only memory (ROM), flash memory, a hard disk drive, a combination of such devices, etc., that is suitable for storing program guide instructions for execution by control circuitry 42. It should be understood that memory 44 may temporarily cache program guide data when, for example, generating a program guide display screen. Such caching or temporary buffering of data such as the data received from the continuous stream of current program guide data by memory 44 should not be confused, however, with the substantial use of memory in other program guide systems to store a database of program guide data that is refreshed by periodic downloads.

Set-top box 28 may also include communications device 27 for transmitting requests to program guide server 25 over request communications path 70. Communications device 27 may be, for example, a modem (e.g., any suitable analog digital telephone dialup modem, or a cable modem), network interface card (e.g., an Ethernet card), or any other device suitable for transmitting requests to program guide server 25. Request communications path 20 is preferably a return-path on communications path 20, but may be a separate suitable communications path.

User television equipment 22 may also have secondary storage device 47 and digital storage device

49 for recording programming. Secondary storage device 47 can be any suitable type of analog or digital program storage device (e.g., a videocassette recorder, a digital video disc (DVD) player with recording capabilities, etc.). Program recording and other functions may be controlled by control circuitry 42. Digital storage device 49 can be, for example, a writeable optical storage device (such as a DVD player capable of handling recordable DVD discs), a magnetic storage device (such as a disk drive or digital tape), or any other such suitable digital storage device.

The user may control the operation of user television equipment 22 with user interface 46. User interface 46 may be a pointing device, wireless remote control, keyboard, dedicated sets of buttons (e.g., buttons located on various hardware components), touch-pad, voice recognition system, or any other suitable user input device. To watch television, the user may instruct control circuitry 42 to display a desired television channel on monitor 45. To access the functions of the program guide, the user may instruct the program guide to generate a main menu or other desired program guide display screen for display on monitor 45.

When a user indicates a desire to access the interactive television program guide (e.g., by using a "menu" key on remote control 40), the program guide generates an appropriate program guide display screen for display on monitor 45. A main menu screen, for example, such as illustrative main menu screen 100 of FIG. 4, may be generated that provides the user with access to various program guide functions. Main menu

screens may also contain various advertisements, logos, etc.

Illustrative main menu screen 100 of FIG. 4, for example, may include menu 102 of selectable program guide options 106. If desired, the program guide options 106 may be organized according to feature type. In menu 102, for example, program guide options 106 have been organized into three columns. The column labeled "TV GUIDE" is for listings related features, the column labeled "MSO SHOWCASE" is for multiple service organization (MSO) related features, and the column labeled "VIEWER SERVICES" is for viewer related features. The interactive television program guide may generate a display screen for a particular program guide feature when the user selects that feature from menu 102.

Main menu screen 100 may include one or more selectable advertisements 108. Selectable advertisements 108 may, for example, include text and graphics advertising pay-per-view programs. When the user selects a selectable advertisement 108, the program guide may display information (e.g., pay-per-view information) or take other actions related to the content of the advertisement. Pure text advertisements may be presented, if desired, as illustrated by selectable advertisement banner 110.

Main menu screen 100 may also include other screen elements. The brand of the program guide product may be indicated, for example, using a product brand logo graphic such as product brand logo graphic 112. The identity of the television service provider may be presented, for example, using a service provider logo graphic such as service provider logo

graphic 114. The current time may be displayed in clock display region 116. In addition, a suitable indicator such as indicator graphic 118 may be used to indicate to the user that a message from a cable operator is waiting for the user if the program guide supports messaging functions.

One function of the interactive television program guide may be to provide the user with the opportunity to view television program listings. A user may indicate a desire to view program listings by, for example, positioning highlight region 120 over a desired program guide option. Alternatively, the program guide may present program listings when the user presses a suitable key (e.g., a "guide" key) on remote control 40. When the user indicates a desire to view television program listings, the program guide may obtain program listings data from the continuous data stream or by request from server 25 and may generate an appropriate program listings screen for display on monitor 45. A program listings screen may contain one or more groups or lists of program listings organized according to one or more organization criteria (e.g., by program category).

The program listings screen may be overlaid over a program being viewed by the user or overlaid over a portion of the program in a "browse" mode. The program guide may, for example, provide the user with the opportunity to view listings by time, by channel, according to a number of categories (e.g., movies, sports, children, etc.), or may allow the user to search for a listing by title. Program listings may be displayed using any suitable list, table, grid, or other suitable display arrangement. If desired,

program listings display screens may include selectable advertisements, product brand logo graphics, service provider brand graphics, clocks, or any other suitable indicator or graphic.

FIGS. 5a and 5b illustrate the display of program listings by time and by channel, respectively. The program listings display screens 130 and 135 of FIGS. 5a and 5b may include highlight region 151, which highlights the current program listing 150. The user may position highlight region 151 by entering appropriate commands with user interface device 52. For example, if user input interface device 52 has a keypad, the user can position highlight region 151 using "up," "down," "left," and "right" arrow keys. Remote program listings may also be panned left, right, up, and down by positioning highlight region 151 using the arrow keys on remote control 40. Alternatively, a touch sensitive screen, trackball, voice recognition device, or other suitable device may be used to move highlight region 151 or to select program listings without the use of highlight region 151. In still another approach, the user may speak a television program listing into a voice request recognition system. These methods of selecting program listings are merely illustrative. Any other suitable approach for selecting program listings may be used if desired.

The program guide may provide the user with the opportunity to view program listings for other times or channels. The user may indicate a desire to access listings for other times or channels by, for example, using "left" and "right" arrow keys to change time slots (when program listings are presented by time as shown in FIG. 5a), or "left" and "right" arrow keys

to change channels (when program listings are presented by channel as shown in FIG. 5b). In response to such an indication, the program guide may, for example, scroll or page the program listings to display additional program listings.

The program guide uses the continuous stream of current program guide data as a low-latency source of current program listings and other frequently requested information. The program guide uses server 25 to supply data on request typically when data is needed less urgently. The program guide may, for example, retrieve program listings data from the continuous data stream whenever the data to be retrieved is related to current programming (i.e., programming that is being broadcast or that is scheduled to be available in the next few hours).

If desired, the program guide may be configured to recognize the type of program guide data carried in the data stream (e.g., based on attribute fields in the continuous data stream). If the program guide has the capability to recognize data in the continuous data stream, the program guide may be configured to always attempt to retrieve data from the continuous data stream (either before or at the same time that the program guide attempts to request data from server 25). The program guide may obtain data from the continuous data stream or from program guide server 25 based on when particular program guide functions are accessed. These examples are merely illustrative. The program guide may use these and other suitable techniques for accessing data in the continuous data stream and requesting data from server 25.

As mentioned above, the program guide may be programmed to always retrieve television program listings for the current time of day from the continuous data stream. This may occur, for example, in response to the user indicating a desire to access program listings (e.g., by selecting "by time" feature from main menu screen 100). If the user indicates a desire to see program listings for a time other than the current time of day (e.g., by using remote control arrow keys to select program listings many hours or days in the future), the program guide may generate a request for obtaining those program listings and may transmit the request to program guide server 25 over communications path 20. If desired, the program guide may also prefetch program listings for other time slots from the continuous data stream or program guide server 25.

After a user selects a program listing, the interactive program guide may provide the user with access to a number of program guide functions associated with the selected listing. The program guide may, for example, provide the user with additional program information for the program listings. This may be done in response to a user indicating a desire to access additional program information by, for example, positioning highlight region 151 (FIGS. 5a and 5b) over a listing 150 and pressing an "info" key on remote control 40.

The program guide may obtain the additional program information by requesting the additional program information from program guide server 25. The program guide makes such requests, for example, whenever the program guide determines that the

additional program guide information is not included in the continuous data stream, or if the program guide has been configured to automatically obtain all additional program information from program guide server 25. In practice, additional program information (at least additional program information for programs other than current programs) is preferably not included in the continuous data stream due to bandwidth constraints. Additional program information for a listing or group of listings may, for example, be prefetched from program guide server 25 when a user highlights a particular program listing, when the program guide displays listings on a display screen, or in response to any other suitable event.

Once the program guide has obtained the additional program information from the continuous data stream or program guide server 25, the program guide may generate an additional program information screen. An illustrative additional program information screen 161 is shown in FIG. 6. Like other program guide display screens, additional program information screen 161 may include selectable advertisements, service provider logos, brand logos, a mail indicator, and a clock region. Additional program information screen 161 may also include program information window 162 for displaying the additional program information retrieved by the program guide. If a portion of the additional program information extends past the bottom of program information window 162, the user may, for example, use a remote control arrow key to scroll through the additional program information.

The program guide may display program listings organized by category. In practice, such a

function may require the program guide to obtain program listings data from program guide server 25, because including category information for the program listings in the continuous data stream may require too much bandwidth, or because sorting program listings based on category attributes may be a heavier processing burden to place on user television equipment 22 than is desired.

If the user selects "Movies," "Sports," or "Children" selectable program guide options 106 of main menu 102 (FIG. 4), for example, the program guide may issue a request to program guide server 25 querying program guide server 25 for program listings of the appropriate category. Alternatively, if the program listings in the continuous data stream are accompanied by category information, the program guide may filter program listings from the continuous data stream based on the appropriate category, and may retrieve additional listings in that category from program guide server 25.

FIG. 7 shows illustrative program listings by category screen 180 in which program listings for movies are displayed. Program listings by category screen 180 may be generated by the program guide when, for example, the user selects the "Movies" selectable feature 106 of FIG. 4. Similar program listings by category screens 180 may be generated by the program guide in which program listings are sorted by any suitable category.

Program listings by category screen 180 may include, for example, selectable advertisements, service provider logos, brand logos, advertisement banners, a mail indicator, and a clock region. Program

listings for the selected category may be displayed in list 182. The program guide may also provide the user with access to additional features related to a particular listing when, for example, the user selects that listing. The user may view program listings for additional time slots or channels on screen 180 by, for example, using remote control arrow keys to manipulate the display.

The interactive program guide may allow the user to view program listings while watching television programming by, for example, overlaying a "FLIP" or "BROWSE" display region over a television program. FIG. 8a shows an illustrative FLIP display 200 that the program guide may display whenever the user changes television channels. The FLIP display may contain information associated with the current program, such as the program title 210, run time 215, the current channel number 216, and the current channel's call letters 225. The FLIP display may also include a number of graphics, such as brand logo 230, a sponsorship graphic, a channel logo graphic, mail indicator or any other suitable graphic. The program's rating may also be displayed. If desired, brand logo 230 may be replaced with or used together with a selectable information icon. The user may select the selectable information icon to obtain additional program information for the program currently displayed in FLIP display 200.

FLIP display 200 may also include rating indicator 227 for indicating the rating of the current program. Rating information may be carried in the continuous data stream. If the program guide provides a parental control feature, the rating of the program

on each new channel the user tunes to may be examined by the program guide to determine if the program meets parental control settings that were previously established by the user. If the program rating is not acceptable, the program guide may, for example, display only the FLIP banner without the program video.

FIG. 8b shows an illustrative "BROWSE" overlay or display that the program guide may display when the user opts to browse through program listings for a given time slot. The user may browse through program listings by, for example, using remote control arrow keys.

The FLIP and BROWSE overlays of FIGS. 8a and 8b have been shown as including a brand logo displayed at the left of the overlay. The logo may also, for example, promote different sponsors as the user browses program listings or flips between channels. The logos may change within the same overlay or banner if the user displays the overlay or banner for a predefined time. The logo may, for example, automatically rotate through a list of logo advertisements, returning to the first advertisement after each advertisement in the list has been displayed. The brand logo may also be replaced by a text based advertisement.

Program listings data for the FLIP overlay may be obtained by the program guide from the continuous data stream when the user changes channels. Program listings data for the BROWSE overlay may also be obtained by the program guide from the continuous data stream, but may also be obtained from program guide server 25 if the user indicates a desire to view program listings data not carried in the continuous data stream (e.g., program listings for programs not in

the current time slot or program listings for programs more than a few hours in the future). If desired, program listing data may be prefetched for adjacent time slots from program guide server 25 when, for example, FLIP information is displayed, when the user indicates a desire to enter the browse mode, or in response to any other suitable event.

The program guide may provide functions that involve various real-time actions related to the broadcast of a specific program or series. For example, the program guide may allow the user to set reminders, order pay-per-view programs, record programs, lock and unlock programs, etc. These functions involve actions that are performed by the program guide in coordination with programs as they are broadcast. For example, a program guide reminder function may allow a user to set a reminder for upcoming airing of a program. Just before the broadcast of the program, the program guide displays a reminder on the user's television. The reminder alerts the user that the program is about to begin. Thus the program guide action of displaying the program reminder must be coordinated with the broadcast of the program.

If all programs were broadcast at their scheduled broadcast times, the program guide could simply rely upon program listings data provided to the program guide that specifies when each program is to be broadcast. However, programs are sometimes not aired at their scheduled times. This may occur, for example, when a sporting event that precedes a given television program runs longer than expected.

In order to accommodate unexpected shifts in the broadcast times of certain programs, each airing of

a program may be assigned a unique identifier. The identifier may be assigned, for example, at main facility 12 and may be distributed by distribution equipment 21. Unique identifiers may also be assigned to program groupings (e.g., series, mini-series, orderable packages of programs, or other suitable groupings of programs). The identifiers associated with each program or program grouping may be provided to the program guide with the program listings data. When a user sets a reminder or uses other such functions, the program guide may store the identifier in memory in user television equipment 22. At an appropriate time (e.g., before or during the broadcast of a program), each unique identifier is placed into the continuous data stream. The program guide may therefore monitor the stream to determine in real-time whether a particular program (e.g., a single program or a program in a program grouping for which a reminder was set) is being broadcast. If the broadcast time of a program shifts, the reminder function will still notify the user at the appropriate time (i.e., just before the program airs).

The unique identifier in the data stream may be transmitted, for example, when a program starts, when a program ends, or continuously during a program. If there are any schedule changes, the unique identifiers for programs whose broadcast times have shifted may be transmitted at the correct times to reflect these changes. Thus, a selected program can be rescheduled for a different time, day, or channel and the associated action will still be performed correctly by the program guide.

When the user first accesses a function of the program guide that involves a real-time action associated with a program or series (e.g., when the user of the program guide sets up a reminder or the like), the program guide may retrieve the unique identifier from the continuous data stream (if it is available) or may request the unique identifier from program guide server 25. The identifier is then stored locally on the user television equipment for future comparison to the identifiers provided in the continuous stream of current data.

The program guide may maintain a list of upcoming actions on user television equipment 22. Preferably, the list of upcoming actions is maintained in a memory such as memory 44 in control circuitry 42 of user television equipment 22 (FIG. 3). The program guide may store the unique identifier and the requested associated action in the list. The program guide may monitor the continuous data stream for unique identifiers and perform listed actions when their associated unique identifiers appear in the continuous data stream. If a unique identifier is for a series, the program guide may perform the listed action every time a program in the series is shown. The program guide may ignore any identifier that appears in the continuous data stream that does not match an action in the list. In addition, the program guide may allow actions to expire and may remove them from the list if the identifier associated with the action is not detected in the continuous data stream for a predefined period of time.

One function that may involve a real-time action associated with a television program is a

reminder function. The program guide may provide the user with the opportunity to set a program reminder to be displayed at, for example, the start time of a program. The program guide may present the user with opportunities to set reminders whenever the user indicates an interest in a future program (e.g., by pressing a remote control enter key after highlighting a future program listing), or in response to any other suitable event. The user may indicate a desire to set a program reminder by, for example, pressing a "remind" button on remote control 40.

If the user indicates a desire to set a program reminder by, for example, highlighting a listing in program listing screens 130 or 135 and pressing a "remind" key on remote control 40, the program guide may generate a suitable reminder overlay. FIG. 9a shows illustrative overlay 300. The program guide may prompt the user to set a reminder and provide the user with the opportunity to select, for example, "Yes" button 305 to set the reminder or "No" button 307 to cancel.

If the user attempts to set a reminder for a program or series for which a reminder has already been set, the program guide may provide the user with the opportunity to cancel the reminder by, for example, displaying reminder confirmation overlay 310 of FIG. 9b. If the user deletes a reminder, the program guide may delete the unique identifier for the selected showing and the associated reminder from the local list of actions.

When the program guide detects the unique identifier for the program for which the reminder was set in the continuous data stream, the program guide

checks the local list of scheduled real-time actions and determines that the associated action involves displaying a reminder. The program guide then displays the reminder for the program. Multiple reminders may be displayed simultaneously if desired. In addition, the program guide may, for example, prefetch program listings data and additional program data for a program or group of programs from the continuous data stream or from program guide server 25 when a reminder is displayed.

The program guide may also provide users with the opportunity to set reminders for program groupings. If, for example, a user wishes to receive a reminder for the series "Mad About You" any time an episode in the series is shown, the user may set such a reminder for the series using any suitable approach. Program grouping reminder lists and related display screens are described, for example, in concurrently filed Knudson et al. U.S. patent application Serial No. 09/330,792, which is hereby incorporated by reference herein in its entirety.

In response to a user indicating a desire to set a reminder for a program grouping, the program guide may store the program grouping identifier in the list of real-time actions. In this example, the program guide would store the program grouping identifiers for the series "Mad About You" in a list of reminders.

Each time an episode in the series "Mad About You" is aired, the program grouping identifier for the series is placed into the continuous data stream. The identifier may, for example, be provided continuously

by main facility 12 and passed to distribution equipment 21 from continuous data stream processor 71.

The program guide may monitor the continuous data stream and compare the identifiers in the data stream with the identifiers in the list of real-time actions. When the identifier for the program grouping is found, which in this example would be the program grouping identifier for the series "Mad About You", the program guide performs the associated real-time action (e.g., displays a reminder).

FIG. 10a and 10b show illustrative program reminder lists 320. In FIG. 10a, reminder list 320 is overlaid on top of the currently display television program to provide the user with the opportunity to view a reminder while still viewing a portion of the television program that the user was watching. In FIG. 10b, reminder list 320 is shown overlaid on top of a program listings display screen, such as program listings display screen 130 of FIG. 5a. The program guide may provide the user with the opportunity to scroll through reminder list 320 by, for example, using remote control arrow keys.

Another example of a real-time action that may be taken by the program guide is the authorization of the viewing of a pay-per-view program. The program guide may authorize viewing based on when the identifier of the desired pay-per-view program is detected in the continuous data stream, thereby preventing errors if the schedule shifts and the like. The program guide may provide the user with an opportunity to order a pay-per-view program when the user selects a pay-per-view program listing from a group of listings, the user presses an "order" key (or

other suitable key) on remote control 40 when tuned to an unordered pay-per-view channel, or in response to any other suitable event.

The program guide may, for example, display a pay-per-view program listings display screen, such as illustrative pay-per-view program listings display screen 350 of FIG. 11a, in response to the user selecting "PPV TIME" feature 106 of main menu 102 (FIG. 4). Like program listings display screens 130 and 135 of FIGS. 5a and 5b, pay-per-view program listings screen 350 may include selectable advertisements, service provider logos, brand logos, a mail indicator, a clock region, etc. The program guide may display listings for pay-per-view programs in other time slots and additional channels when the user presses remote control arrow keys. The program guide may obtain pay-per-view program listings data for display in pay-per-view program listings screen 350 from the continuous data stream or from program guide server 25. As with non-pay-per-view program listings, data for currently available pay-per-view programs and those that are available in the next few hours may be provided in the continuous data stream. Data relating to pay-per-view programs at later times is available on request from server 25.

The program guide may provide the user with an opportunity to order a pay-per-view program for a selected listing. An illustrative pay-per-view ordering overlay 370 is shown in FIG. 11b. The program guide may display pay-per-view ordering overlay 370 when, for example, the user highlights a pay-per-view program listing and presses an "order" or other suitable key on remote control 40. Pay-per-view

ordering overlay 370 may display pay-per-view program information 372 and ordering information 374, and may prompt the user to order the selected pay-per-view program by entering a purchase code. The user may enter the purchase code using, for example, number keys on remote control 40, or may cancel the purchase and return to the last screen by selecting "CANCEL" button 376. The program guide may also provide the user with the opportunity to confirm the pay-per-view order using illustrative order confirmation overlay 380 of FIG. 11c. If desired, the program guide may display order confirmation overlay 380 of FIG. 11c instead of pay-per-view ordering overlay 370 to provide the user with the opportunity to order a pay-per-view program without requiring the user to enter a purchase code.

The program guide may have obtained the unique identifier for the particular showing of the selected pay-per-view program when it retrieved listings data from either the continuous data stream or program guide server 25. Otherwise, the program guide may query program guide server 25 at this point to obtain the unique identifier. The program guide may search the locally maintained list of upcoming actions for the identifier to determine if the selected pay-per-view program has been ordered. As shown in FIG. 11d, the program guide may indicate to the user that the pay-per-view program has already been ordered, and may provide the user with the opportunity to cancel the current order by displaying, for example, overlay 390.

The program guide may also search the continuous data stream for the unique identifier of the selected pay-per-view program to determine if the

selected program is being broadcasted at the time the user is placing the order. As shown in FIG. 11e, the program guide may indicate to the user that the program is being shown by, for example, displaying overlay 395, and providing the user with the opportunity to cancel the order.

Once a pay-per-view program has been ordered, the program guide may store its unique identifier and the associated action (i.e., a pay-per-view program authorization) in a list of such actions (i.e., as a list of ordered pay-per-view programs that are to be authorized). While the user watches television or is using the program guide, the program guide may monitor the continuous data stream for unique identifiers and compare the received identifiers to the identifiers in the list. If, for example, the program guide receives the identifier for the ordered pay-per-view program when the pay-per-view program starts, the program guide may indicate to the user that the pay-per-view program is starting. The program guide may, for example, overlay a window or banner over the television program that the user is watching as shown in FIG. 12a, or may overlay a banner or window over a program guide display screen that the user has accessed, as shown in FIG. 12b. The program guide may provide the user with an opportunity to tune to the pay-per-view program by, for example, selecting "Yes" button 400 of FIGS. 12a and 12b. If desired, the program guide may prefetch program listings data or additional program data for the pay-per-view program from the continuous data stream or from program guide server 25 when the window or banner is displayed.

It is possible that a user may not have used user television equipment 22 for the period of time during which the ordered pay-per-view program was aired. The program guide may delete such entries after a predefined period of time. The program guide may also indicate to a user that the user has missed an ordered pay-per-view program. The program guide may, for example, check the list of ordered pay-per-view programs periodically (e.g., every few minutes) and may compare the stored identifiers to the unique identifiers carried in the continuous data stream. Identifiers may, for example, include a date and time component, or may be sequentially numbered based on the times the programs are broadcasted. The program guide may compare the identifiers carried on the continuous data stream to the identifiers in the list of ordered programs and may determine if any of the programs in the list have already been viewed.

The program guide may indicate to the user that an action such as a scheduled pay-per-view program authorization is no longer current by, for example, displaying an overlay or window over a television program or program guide display screen. FIGS. 13a and 13b show illustrative windows 410 that are overlaid on top of a television program and a program guide display screen, respectively, and that display a missed pay-per-view program and prompt the user to indicate whether the user wishes to reschedule. The user may reschedule the missed pay-per-view program by, for example, selecting "Yes" button 415. The program guide may reschedule the pay-per-view program by, for example, querying program guide server 25 (FIG. 1) for the next showing of the program and storing the unique

identifier for that showing of the program in a list of actions (i.e., a list of upcoming reminders, upcoming pay-per-view authorizations, etc.) with an associated action code.

The program guide may also provide a user with the opportunity to order a package of pay-per-view programs. Program guide systems that provide a user with the opportunity to purchase a package of pay-per-view programs and illustrative display screens, are described, for example, in Knudson et al. U.S. patent application Serial No. 08/944,153, filed October 6, 1997, which is hereby incorporated by reference herein in its entirety. The program guide may authorize the viewing of a pay-per-view package in a way similar to how it authorizes the viewing of a program. In response to the user indicating a desire to order a pay-per-view package, the program guide may store an identifier and the associated action (i.e., a pay-per-view program package authorization) in a list of such actions (i.e., as a list of ordered pay-per-view programs that are to be authorized).

Whenever a pay-per-view program in the package is available, the identifier for the package is transmitted in the continuous data stream. While the user watches television or is using the program guide, the program guide may monitor the continuous data stream and compare the received identifiers to the identifiers in the list. When the unique identifier for the package is transmitted, the program guide may indicate to the user that one of the ordered programs is starting.

In another suitable approach, the program guide may store the unique identifiers of each of the

programs of the package in the list. Whenever a program in the package is available, its unique identifier is transmitted in the continuous data stream. The program guide may receive the unique identifiers for each program as they are aired, compare them to the list, and authorize the airing or perform another function (e.g., indicate the program is starting, indicate the program was aired, etc.).

The program guide may also provide the user with the opportunity to record programs. FIGS. 14a and 14b show illustrative overlays that may be displayed by the program guide in response to a user indicating a desire to record a program. FIG. 14a may be displayed when, for example, a user indicates a desire to record the program that the user is watching (e.g., by pressing a "record" key on remote control 40). FIG. 14b shows an illustrative overlay that may be overlaid a program listings display screen when, for example, a user highlights a listing and indicates a desire to record the listing (e.g., by pressing a "record" key on remote control 40). The overlay may prompt the user to confirm the record. These ways of providing a user with the opportunity to record a program are only illustrative and any other suitable approach may be used.

After the user has indicated a desire to record a program and, if desired, confirmed the record, the program guide may save the identifier of the program and the associated action (i.e., a program record) in a list of such actions (i.e., as a list of programs to record). The program guide may also provide the user with the opportunity to record a program grouping and may save a program grouping

identifier when the user indicates a desire to do so. The program guide may then monitor the continuous data stream for the unique identifier. If desired, the program guide may monitor the continuous data stream in a power-save mode. When the unique identifier for the program or program grouping is transmitted in the continuous data stream, the program guide may record the program or program grouping on digital storage device 31 or 49 (as shown in FIGS. 2 and 3, respectively), or, on secondary storage device 32 or 47 (as shown in FIGS. 2 and 3, respectively).

Another example of a real-time action that may be taken by the program guide is locking a program and requesting a parental control code when a user attempts to view a locked program (or program guide data for a program). Locking a program includes locking all showings of a particular program and locking all showings of programs in a program grouping. FIG. 15a shows an illustrative parental control overlay 1500 that the program guide may display in response to a user indicating a desire to lock a program. FIG. 15a shows overlay 1500 overlaid a program listings screen. The program guide may also display overlay 1500 over a program that the user is watching.

A user may indicate a desire to lock programs by, for example, highlighting its listing and pressing a "lock" key or remote control 40. In response, the program guide may display overlay 1500 and provide the user with the opportunity to, for example, lock programs by title, rating, channel, or any other suitable criteria. Locking by title includes, for example, locking all showings of a particular program and locking all showings of programs in a program

grouping. In response to the user locking a program, the program guide may save the identifier of the locked program and the associated action (i.e., a program lock) in a list of such actions (i.e., as a list of locked programs). If programs have been locked by title, the program guide may, for example, store an identifier of the program grouping (e.g., a series) in the list of associated actions.

When a user tunes to a program, the program guide may obtain a unique identifier for the program (or its grouping) and compare it to identifiers in the list of identifiers. If the identifier for the program (or its grouping) is present in the list, the program guide may determine that the associated real-time action is, for example, the locking of the program. If the program guide determines that the program is locked, the program guide may display parental control overlay 1510. When the user enters the correct parental control code, the program guide may delete the unique identifier for the program from the list and display the program. Alternatively, the program guide may leave the identifier in the list (e.g., when it is a program grouping identifier) and allow the user to view the current showing.

FIG. 15b shows an illustrative parental control overlay 1510 that the program guide may display when a user indicates a desire to access a program that has been parentally locked. FIG. 15b shows overlay 1510 that may be displayed when a user tunes to a locked program (e.g., by flipping to a channel as shown, turning to a channel from a browse overlay, or by tuning to a channel from another program guide display screen).

The program guide may also display parental control overlay 1510 when the user indicates a desire to access program guide data for a locked program. When the user indicates a desire to access program guide data either from the continuous data stream or from program guide server 25, the program guide may obtain the identifier for the program (or grouping), compare it to the list of identifiers, and prompt the user for a parental control code.

FIGS. 16-18 are flowcharts of illustrative steps involved in operating the interactive program guide system of the present invention. The steps shown in FIGS. 16-18 are illustrative and may be combined and performed in any suitable order.

FIG. 16 shows illustrative steps involved in obtaining program guide data with the program guide. At step 500, program guide data is received at television distribution facility 16 from main facility 12. A first portion of the program guide data is distributed by television distribution facility 16 to each of the program guides implemented on user television equipment 22 over communications paths 20 (step 510). This first portion of the program guide data may contain, for example, program guide listings data for the current time of day, unique identifiers for showings of programs for the current time of day, and any other program guide data that is to be distributed in the continuous stream of current data.

The first portion of the program guide data may be transmitted as a continuous data stream using any suitable transmission technique. It may be transmitted, for example, on a television channel sideband, in the vertical blanking interval of a

television channel, on a dedicated analog or digital channel, across multiple analog or digital channels, or by any other suitable data transmission technique.

At step 520, a second portion of the program guide data is stored by program guide server 25 at television distribution facility 16. If desired, program guide server 25 may be used to store a copy of the information contained in the continuous data stream.

At steps 530 and 540, the program guide obtains program guide data from the continuous data stream and from program guide server 25, respectively. The program guide may, for example, be preprogrammed to obtain certain types of data from the continuous data stream and other types of data from program guide server 25. Alternatively, the continuous program guide data stream may contain attributes that indicate to the program guide the type of data that is contained in the data stream. Steps 530 and 540 may be performed in any suitable order, concurrently, and when the program guide is prefetching data.

If one of the links for the two delivery mechanisms is not operating properly, the program guide may temporarily use one delivery mechanism exclusively. If the link supporting server communications fails, the program guide may temporarily operate using only the continuous data stream. Only access to current program listings (or listings for the next few hours) would be provided. If the link supporting the continuous data stream fails, the program guide may temporarily operate using only the server link, although with increased latency when accessing current data.

Steps 545, 550, and 555 are illustrative steps that may be involved in obtaining program guide data from program guide server 25 with the program guide. At step 545, the program guide may request program guide data from program guide server 25. As mentioned above, the request that is issued by the program guide may include any suitable remote procedure call, message, request, object based communication, or any other suitable request. At step 550, program guide server 25 may process the request and may transmit the requested data to the program guide over communications path 20 (step 555).

FIG. 17 illustrates steps involved in providing the user with program listings data and additional program information using the program guide. At steps 600 and 610, program listings data is obtained with the program guide from the continuous data stream and program guide server 25. Steps 600 and 610 may be performed in any suitable order, concurrently, and when the program guide is prefetching data.

At step 620, the program guide displays the program listings data for the user on user television equipment 22. This may involve, for example, displaying current program listings data obtained from the continuous data stream of current data for a given channel in a FLIP display in response to a user tuning to that channel (step 625). If, for example, the user indicates a desire to browse through additional program listings for the current time or for a time period in the next few hours, the program guide may display program listings obtained from the current data stream in a BROWSE display. If the user indicates a desire to browse through additional program listings for a time

slot that is more than a few hours in the future, the program guide may display program listings obtained from program guide server 25 in the BROWSE display at step 630. Program listings obtained from the continuous data stream may also be displayed in a program listings screen (step 633). Program listings obtained from program guide server 25 (e.g., the program listings for a particular category of programs more than a few hours in the future) may be displayed by the program guide in a suitable program listings by category screen (step 635).

At step 630, the program guide may obtain additional program information from program guide server 25 for a program whose title and other basic information were contained in a program listing obtained from the continuous data stream. This step may be performed by the program guide, for example, when a user selects a program listing within a program listings screen. The additional program information obtained from program guide server 25 may be displayed by the program guide for the user on user television equipment 22 at step 650.

FIG. 18 shows illustrative steps involved in using the program guide to perform real-time actions that are associated with a showing of a program. The program guide may have provided a user with an opportunity to access a program guide function that involves performing a real-time action associated with a showing of a program or with a program series or other program grouping (e.g., mini-series, orderable package, etc.). Examples of such functions and actions include recording (the real-time action is the act of starting the recording of the program), setting

reminders (the real-time action is the display of the reminder just before the desired program is aired), advance pay-per-view purchasing (the real-time action is the authorization of the purchased program when that program is aired), parental control (the real-time action is the locking or unlocking of a particular program when that program is aired), etc. The program guide may obtain a unique identifier for a showing of a program, or for a series, mini-series, orderable package or other program grouping, at step 700. As indicated by steps 705 and 710, the unique identifier may be obtained from the continuous data stream or from program guide server 25, respectively. The unique identifier may, for example, be obtained by the program guide when program listings information for a program is obtained.

At step 720, the unique identifier and the associated real-time action are stored by the program guide (e.g., in a list of upcoming actions). Unique identifiers for showings of programs or for program groupings may be transmitted by television distribution facility 16 as part of the continuous data stream. The program guide may monitor the continuous data stream for the unique identifiers that have been stored by the program guide in user television equipment 22 (e.g., in the form of the list of upcoming actions or other suitable data structure) at step 730. At step 740, the program guide performs an associated real-time action when a unique identifier is detected in the continuous data stream. This may include, for example, displaying a program reminder, authorizing the viewing of a pay-per-view program, notifying a user that a pay-per-view

has started, recording a program, locking a program and requesting a parental control code, etc.

FIGS. 19a-19c show illustrative data flow diagrams of three embodiments of the interactive program guide system of the present invention in which the program guide performs real-time actions based on identifiers transmitted in a continuous data stream. In the data flow diagram of FIG. 19a, identifiers and current program guide data are obtained by the program guide from a continuous data stream transmitted by distribution equipment 21. The program guide also obtains program guide data by generating requests that are processed by program guide server 25. In this approach, the program guide does not store program guide data except for the brief time in which the program guide uses the data for display or for a prefetch. In this approach, the memory requirements of user television equipment 22 may be minimized because no database of program guide data is stored.

In the arrangement of FIG. 19b, the program guide obtains program guide data and identifiers from distribution equipment 21. The identifiers are transmitted by distribution equipment 21 in a continuous data stream. Program guide data, however, may be obtained by the program guide from a data stream transmitted by distribution equipment 21, or from program guide server 25. Program guide data may be transmitted by distribution equipment 21 in a continuous data stream, periodically, or using a suitable hybrid approach. For example, often needed data may be transmitted continuously and less urgent data transmitted periodically. Alternatively, often needed data may be transmitted periodically with a high

frequency, and less urgent data may be transmitted periodically with a low frequency. In still another suitable approach, all data may be transmitted continuously but the cycle rate of some data may vary based on how often the data is needed.

Program guide data obtained either from a data stream provided by distribution equipment 21 or from program guide server 25 is stored by the program guide in program guide database 79. With this approach, user television equipment 22 (FIG. 1) may have memory for storing database 79. Database 79 would preferably contain program guide data for the current time slot and program guide data that is needed often by the program guide. If desired, program guide server 25 may be used by the program guide as, for example, a source of data supplemental to the data stored in database 79. This approach may require less memory than a system in which a significant portion of the available program guide data is stored by the program guide. In addition, the maintenance of a relatively small database of often needed data may minimize the latency of the system.

FIG. 19c shows an illustrative data flow diagram for a further embodiment of the present invention. In this embodiment, the program guide obtains program guide data only from program guide server 25. Identifiers are obtained from a continuous data stream transmitted by distribution equipment 21. This approach may allow program guide server 25 to bear all of the processing and storage burden associated with maintaining a database of program guide data, while still allowing for the program guide to perform

real-time actions at the appropriate time when there is a schedule change.

The foregoing is merely illustrative of the principles of this invention and various modifications can be made by those skilled in the art without departing from the scope and spirit of the invention.

Claims

What is claimed is:

1. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is current program guide data, the system comprising:

a continuous data stream processor configured to select the current program guide data for inclusion in a continuous data stream;

distribution equipment configured to distribute the current program guide data selected by the continuous data stream processor in the continuous data stream to user television equipment;

a program guide server; and

an interactive television program guide implemented on the user television equipment configured to obtain the current program guide data from the continuous data stream and to obtain at least some of the program guide data from the program guide server in response to requests generated by the interactive television program guide.

2. The system defined in claim 1 wherein:

the current program guide data comprises one or more unique identifiers; and

the interactive television program guide is configured to perform a real-time action when a particular unique identifier is in the continuous data stream.

3. The system defined in claim 2 wherein:

the real-time action comprises displaying a program reminder for a program; and

the interactive television program guide is configured to display the program reminder for the program when a particular unique identifier is in the continuous data stream.

4. The system defined in claim 2 wherein:
the real-time action comprises displaying a program reminder; and
the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

5. The system defined in claim 2 wherein:
the real-time action comprises authorizing the viewing of a pay-per-view program; and
the interactive television program guide is configured to authorize the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

6. The system defined in claim 2 wherein:
the real-time action comprises authorizing a viewing of a pay-per-view-program; and
the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the viewing of the pay-per-view program is authorized by the program guide.

7. The system defined in claim 2 wherein:
the real-time action comprises recording a program; and

the interactive television program guide is configured to record a program when a particular unique identifier is in the continuous data stream.

8. The system defined in claim 2 wherein:
the real-time action comprises locking a program and prompting a user for a control code; and
the interactive television program guide is configured to lock a program and prompt the user for a control code when a particular identifier is in the continuous data stream.

9. The system defined in claim 2 wherein:
one or more of the one or more unique identifiers is a program grouping identifier;
the real-time action comprises displaying a program reminder for a program of a program grouping; and
the interactive television program guide is configured to display the program reminder for the program of a program grouping when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

10. The system defined in claim 2 wherein:
one or more of the one or more unique identifiers is a program grouping identifier;
the real-time action comprises displaying a program reminder for a program of a program grouping; and
the interactive television program guide is configured to prefetch current program guide data

from the continuous data stream when the reminder is displayed by the program guide.

11. The system defined in claim 2 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing the viewing of a pay-per-view program of a program grouping; and

the interactive television program guide is configured to authorize the viewing of a pay-per-view program of a program grouping when a particular unique identifier is in the continuous data stream.

12. The system defined in claim 2 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing a viewing of a pay-per-view-program of a program grouping; and

the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the viewing of the pay-per-view program of a program grouping is authorized by the program guide.

13. The system defined in claim 2 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises recording a program of a program grouping; and

the interactive television program guide is configured to record a program of a program grouping

when a particular unique identifier is in the continuous data stream.

14. The system defined in claim 2 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises locking a program of a program grouping and prompting a user for a control code; and

the interactive television program guide is configured to lock a program of a program grouping and prompt the user for a control code when a particular identifier is in the continuous data stream.

15. The system defined in claim 1 wherein the continuous data stream processor obtains current program guide data from the program guide server.

16. The system defined in claim 1 wherein:

the continuous data stream processor prioritizes the current program guide data; and

the distribution equipment cycles the current program guide data in the continuous data stream according to how the current program guide data was prioritized by the continuous data stream processor.

17. The system defined in claim 1 wherein the program guide processes the current program guide data in real-time and with no data caching.

18. The system defined in claim 1 wherein the user television equipment comprises hardware

filtering circuitry configured to filter current program guide data from the continuous data stream based on a tag.

19. The system defined in claim 1 wherein the program guide prefetches current program guide data from the continuous data stream.

20. The system defined in claim 1 wherein the program guide prefetches program guide data from the program guide server.

21. The system defined in claim 1 wherein:

the interactive television program guide is configured to invoke a remote procedure call on the program guide server; and

the program guide server is configured to provide the program guide data to the interactive television program guide in response to the remote procedure call being invoked by the interactive television program guide.

22. The system defined in claim 1 wherein:

the interactive television program guide is configured to obtain program guide data from the program guide server using an object request broker; and

the program guide server is configured to provide program guide data to the interactive television program guide using the object request broker.

23. The system defined in claim 1 wherein:

the interactive television program guide is configured to obtain configuration information from the program guide server using one or more requests; and

the program guide server is configured to store configuration information and to provide the configuration information to the interactive television program guide in response to the one or more requests.

24. The system defined in claim 1 wherein:

the interactive television program guide is configured to obtain user settings from the program guide server using one or more requests; and

the program guide server is configured to store user settings and to provide the user settings to the program guide in response to the one or more requests.

25. The system defined in claim 1 wherein:

the current program guide data has one or more types; and

the program guide is configured to recognize the type of current program guide data carried in the continuous data stream and to obtain current program guide data from the continuous data stream when the current program guide data in the continuous data stream is a particular type.

26. The system defined in claim 1 wherein:

the current program guide data has one or more types; and

the program guide is configured to recognize the type of current program guide data carried in the continuous data stream and to obtain program guide data from the program guide server when the current program guide data in the continuous data stream is not a particular type.

27. The system defined in claim 1 wherein the program guide is configured to obtain program guide data for a program of a particular category from the program guide server.

28. The system defined in claim 1 wherein the program guide is configured to obtain current program guide data from the continuous data stream for a program of a particular category.

29. The system defined in claim 1 wherein the program guide is configured to obtain current program guide data from the continuous data stream when a user indicates a desire to flip channels.

30. The system defined in claim 1 wherein the program guide is configured to (1) obtain current program guide data from the continuous data stream when a user indicates a desire to browse program listings data in a current time slot, and to (2) obtain program guide data from the program guide server when the user indicates a desire to browse program listings data in time slots other than the current time slot.

31. The system defined in claim 1 wherein:

the program guide server is configured to provide program guide data to the continuous data stream processor; and

the continuous data stream processor is configured to receive program guide data from the program guide server and to select current program guide data for inclusion in the continuous data stream from the program guide data provided by the program guide server.

32. The system defined in claim 1 wherein:

the program guide server is configured to continuously provide program guide data to the continuous data stream processor; and

the continuous data stream processor is configured to continuously receive program guide data from the program guide server and to select current program guide data for inclusion in the continuous data stream from the program guide data provided by the program guide server.

33. The system defined in claim 1 wherein:

the program guide server is configured to periodically provide program guide data to the continuous data stream processor; and

the continuous data stream processor is configured to periodically receive program guide data from the program guide server and to select current program guide data for inclusion in the continuous data stream from the program guide data provided by the program guide server.

34. The system defined in claim 1 wherein:

the program guide server is configured to poll the continuous data stream processor and provide program guide data to the continuous data stream processor; and

the continuous data stream processor is configured to receive program guide data from the program guide server and to select current program guide data for inclusion in the continuous data stream from the program guide data provided by the program guide server.

35. The system defined in claim 1 wherein:

the program guide server is configured to provide program guide data to the continuous data stream processor in response to requests generated by the continuous data stream processor; and

the continuous data stream processor is configured to generate one or more requests for program guide data, provide the one or more requests to the program guide server, receive program guide data from the program guide server, and to select current program guide data for inclusion in the continuous data stream from the program guide data provided by the program guide server.

36. The system defined in claim 1 wherein:

the system further comprises a main facility configured to provide a continuous data stream of current program guide data; and

the continuous data stream distributed by the distribution equipment is the continuous data stream provided by the main facility.

37. The system defined in claim 1 wherein the continuous data stream processor is configured to select current program guide data from programmer provided in-band information.

38. The system defined in claim 1 wherein the continuous data stream processor is configured to localize program guide data provided by a main facility and to select the current program guide data for inclusion in a continuous data stream from the program guide data that is localized by the continuous data stream processor.

39. The system defined in claim 1 wherein:

the program guide server is configured to localize program guide data provided by a main facility; and

the distribution equipment is configured to distribute the program guide data that is localized by the program guide server.

40. The system defined in claim 1 wherein:

the continuous data stream processor is configured to select the current program guide data for inclusion in a plurality of continuous data streams wherein each continuous data stream of the plurality of continuous data streams carries current program guide data for a particular program guide display screen;

the distribution equipment is configured to distribute the plurality of continuous data streams to the user television equipment; and

the interactive television program guide is configured to obtain current program guide data for

a particular program guide display screen from the continuous data stream that carries current program guide data for that particular program guide display screen.

41. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

a continuous data stream processor configured to select one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream;

distribution equipment configured to distribute the one or more unique identifiers selected by the continuous data stream processor to the user television equipment in the continuous data stream; and

an interactive television program guide implemented on the user television equipment configured to obtain the one or more unique identifiers selected by the continuous data stream processor and to perform a real-time action when a particular unique identifier is in the continuous data stream.

42. The system defined in claim 41 wherein:

the real-time action comprises displaying a program reminder for a program; and

the interactive television program guide is configured to display the program reminder for the program when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

43. The system defined in claim 41 wherein:
the real-time action comprises displaying a program reminder; and
the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

44. The system defined in claim 41 wherein:
the real-time action comprises authorizing the viewing of a pay-per-view program; and
the interactive television program guide is configured to authorize the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

45. The system defined in claim 41 wherein:
the real-time action comprises authorizing a viewing of a pay-per-view-program; and
the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the viewing of the pay-per-view program is authorized by the program guide.

46. The system defined in claim 41 wherein:
the real-time action comprises recording a program; and
the interactive television program guide is configured to record a program when a particular unique identifier is in the continuous data stream.

47. The system defined in claim 41 wherein:

the real-time action comprises locking a program and prompting a user for a control code; and

the interactive television program guide is configured to lock a program and prompt the user for a control code when a particular identifier is in the continuous data stream.

48. The system defined in claim 41 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the interactive television program guide is configured to display the program reminder for the program of a program grouping when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

49. The system defined in claim 41 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

50. The system defined in claim 41 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing the viewing of a pay-per-view program of a program grouping; and

the interactive television program guide is configured to authorize the viewing of a pay-per-view program of a program grouping when a particular unique identifier is in the continuous data stream.

51. The system defined in claim 41 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing a viewing of a pay-per-view-program of a program grouping; and

the interactive television program guide is configured to prefetch current program guide data from the continuous data stream when the viewing of the pay-per-view program of a program grouping is authorized by the program guide.

52. The system defined in claim 41 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises recording a program of a program grouping; and

the interactive television program guide is configured to record a program of a program grouping when a particular unique identifier is in the continuous data stream.

53. The system defined in claim 41 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises locking a program of a program grouping and prompting a user for a control code; and

the interactive television program guide is configured to lock a program of a program grouping and prompt the user for a control code when a particular identifier is in the continuous data stream.

54. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is current program guide data and one or more unique identifiers, the system comprising:

a continuous data stream processor configured to select the current program guide data and one or more of the one or more unique identifiers for inclusion in a continuous data stream;

distribution equipment configured to distribute the current program guide data and one or more unique identifiers selected by the continuous data stream processor in the continuous data stream to the user television equipment;

a program guide server; and

an interactive television program guide implemented on user television equipment configured:

to obtain one or more of the one or more unique identifiers from the continuous data stream;

to obtain the current program guide data from the continuous data stream and to store at

least some of the current program guide data in a database stored in the user television equipment; and

to obtain at least some of the program guide data from the program guide server in response to requests generated by the interactive television program guide.

55. The system defined in claim 54 wherein the interactive television program guide is configured to store at least some of the program guide data obtained from the program guide server in the database.

56. An interactive television program guide system in which program guide data is provided and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

a continuous data stream processor configured to select one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream;

distribution equipment configured to distribute the one or more unique identifiers selected by the continuous data stream processor to the user television equipment in the continuous data stream;

a program guide server; and

an interactive television program guide implemented on user television equipment configured to obtain the one or more unique identifiers from the continuous data stream and to obtain at least some of the program guide data from the program guide server in response to requests generated by the interactive television program guide.

57. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is current program guide data, the system comprising:

means for selecting current program guide data for inclusion in a continuous data stream;

means for distributing the current program guide data selected by the means for selecting to the user television equipment in the continuous data stream;

means for providing program guide data using a client-server based approach; and

means for obtaining current program guide data from the continuous data stream and to obtain program guide data from the means for providing program guide data using the interactive television program guide implemented on the user television equipment in response to requests generated by the interactive television program guide.

58. The system defined in claim 57 wherein:

the current program guide data comprises one or more unique identifiers; and

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for performing a real-time action when a particular unique identifier is in the continuous data stream.

59. The system defined in claim 58 wherein:

the real-time action comprises displaying a program reminder for a program; and

the means for performing a real-time action comprises means for displaying the program reminder for the program when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

60. The system defined in claim 58 wherein:

the real-time action comprises displaying a program reminder; and

the means for performing a real-time action comprises means for prefetching the current program guide data from the continuous data stream when the reminder is displayed by the means for performing a real-time action.

61. The system defined in claim 58 wherein:

the real-time action comprises authorizing the viewing of a pay-per-view program; and

the means for performing a real-time action comprises means for authorizing the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

62. The system defined in claim 58 wherein:

the real-time action comprises authorizing a viewing of a pay-per-view-program; and

the means for performing a real-time action comprises means for prefetching current program guide data from the continuous data stream when the

viewing of the pay-per-view program is authorized by the means for performing a real-time action.

63. The system defined in claim 58 wherein:

the real-time action comprises recording a program; and

the means for performing a real-time action comprises means for recording a program when a particular unique identifier is in the continuous data stream.

64. The system defined in claim 58 wherein:

the real-time action comprises locking a program and prompting a user for a control code; and

the means for performing a real-time action comprises means for locking a program and prompting the user for a control code when a particular identifier is in the continuous data stream.

65. The system defined in claim 58 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the means for performing a real-time action comprises means for displaying the program reminder for the program of a program grouping when a particular unique identifier is in the continuous data stream.

66. The system defined in claim 58 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the means for performing a real-time action comprises means for prefetching current program guide data from the continuous data stream when the reminder is displayed by the means for performing a real-time action.

67. The system defined in claim 58 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing the viewing of a pay-per-view program of a program grouping; and

the means for performing a real-time action comprises means for authorizing the viewing of a pay-per-view program of a program grouping when a particular unique identifier is in the continuous data stream.

68. The system defined in claim 58 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing a viewing of a pay-per-view-program of a program grouping; and

the means for performing a real-time action comprises means for prefetching current program guide data from the continuous data stream when the

viewing of the pay-per-view program of a program grouping is authorized by the means for performing a real-time action.

69. The system defined in claim 58 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises recording a program of a program grouping; and

the means for performing a real-time action comprises means for recording a program of a program grouping when a particular unique identifier is in the continuous data stream.

70. The system defined in claim 58 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises locking a program of a program grouping and prompting a user for a control code; and

the means for performing a real-time action comprises means for locking a program of a program grouping and prompting the user for a control code when a particular identifier is in the continuous data stream.

71. The system defined in claim 57 wherein the means for selecting obtains current program guide data from the means for providing program guide data using a client-server based approach.

72. The system defined in claim 57 wherein:

the means for selecting comprises means for prioritizing the current program guide data; and

the means for distributing comprises means for cycling the current program guide data in the continuous data stream according to how the current program guide data was prioritized by the means for selecting.

73. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for processing the current program guide data in real-time and with no data caching.

74. The system defined in claim 57 wherein the user television equipment comprises means for filtering current program guide data from the continuous data stream based on a tag.

75. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for prefetching current program guide data from the continuous data stream.

76. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for prefetching program guide data from the means for providing program guide data using a client-server based approach.

77. The system defined in claim 57 wherein:

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for invoking a remote procedure call on the means for providing program guide data using a client-server based approach; and

the means providing program guide data using a client-server based approach comprises means for providing the program guide data to the means for obtaining current program guide data and program guide data using the interactive television program guide in response to the remote procedure call being invoked.

78. The system defined in claim 57 wherein:

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for using an object request broker to obtain program guide data from the means for providing program guide data using a client-server bases approach; and

the means for providing program guide data using a client-server based approach comprises means for providing program guide data to the means for obtaining current program guide data and program guide data using the interactive television program guide using the object request broker.

79. The system defined in claim 57 wherein:

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining

configuration information from the means for providing program guide data using a client-server based approach using one or more requests; and

the means for providing program guide data using a client-server based approach comprises means for storing configuration information and providing the configuration information to the means for obtaining current program guide data and program guide data using the interactive television program guide in response to the one or more requests.

80. The system defined in claim 57 wherein:

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining user settings from the means for providing program guide data using a client-server based approach using one or more requests; and

the means for providing program guide data using a client-server based approach comprises means for storing user settings and for providing the user settings to the means for obtaining current program guide data and program guide data using the interactive television program guide in response to the one or more requests.

81. The system defined in claim 57 wherein:

the current program guide data has one or more types; and

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for recognizing the type of current program guide data

carried in the continuous data stream and for obtaining current program guide data from the continuous data stream when the current program guide data in the continuous data stream is a particular type.

82. The system defined in claim 57 wherein:

the current program guide data has one or more types; and

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for recognizing the type of current program guide data carried in the continuous data stream and for obtaining program guide data from the means for providing program guide data using a client-server based approach when the current program guide data in the continuous data stream is not a particular type.

83. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining program guide data for a program of a particular category from the means for providing program guide data using a client-server based approach.

84. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining current program guide data from the continuous data stream for a program of a particular category.

85. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining current program guide data from the continuous data stream when a user indicates a desire to flip channels.

86. The system defined in claim 57 wherein the means for obtaining current program guide data and program guide data using the interactive television program guide comprises:

means for obtaining current program guide data from the continuous data stream when a user indicates a desire to browse program listings data in a current time slot; and

means for obtaining program guide data from the means for providing program guide data using a client-server based approach when the user indicates a desire to browse program listings data in time slots other than the current time slot.

87. The system defined in claim 57 wherein:

the means for providing program guide data using a client-server based approach comprises means for providing program guide data to the means for selecting current program guide data; and

the means for selecting current program guide data comprises means for receiving program guide data from the means for providing program guide data using a client-server based approach and for selecting current program guide data for inclusion in the continuous data stream from the program guide data

provided by the means for providing program guide data using a client-server based approach.

88. The system defined in claim 57 wherein:

the means for providing program guide data using a client-server based approach comprises means for continuously providing program guide data to the means for selecting current program guide data; and

the means for selecting current program guide data comprises means for continuously receiving program guide data from the means for providing program guide data using a client-server based approach and for selecting current program guide data for inclusion in the continuous data stream from the program guide data provided by the means for providing program guide data using a client-server based approach.

89. The system defined in claim 57 wherein:

the means for providing program guide data using a client-server based approach comprises means for periodically providing program guide data to the means for selecting current program guide data; and

the means for selecting current program guide data comprises means for periodically receiving program guide data from the program guide server and for selecting current program guide data for inclusion in the continuous data stream from the program guide data provided by the means for providing program guide data using a client-server based approach.

90. The system defined in claim 57 wherein:

the means for providing program guide data using a client-server based approach comprises

means for polling the means for selecting current program guide data and providing program guide data to the means for selecting current program guide data; and

the means for selecting current program guide data comprises means for receiving program guide data from the means for providing program guide data using a client-server based approach and for selecting current program guide data for inclusion in the continuous data stream from the program guide data provided by the means for providing program guide data using a client-server based approach.

91. The system defined in claim 57 wherein:

the means for providing program guide data using a client-server based approach comprises means for providing program guide data to the means for selecting current program guide data in response to requests generated by the means for selecting current program guide data; and

the means for selecting current program guide data comprises means for generating one or more requests for program guide data, providing the one or more requests to the means for providing program guide data using a client-server based approach, receiving program guide data from the means for providing program guide data using a client-server based approach, and selecting current program guide data for inclusion in the continuous data stream from the program guide data provided by the means for providing program guide data using a client-server based approach.

92. The system defined in claim 57 wherein:

the system further comprises means for providing a continuous data stream of current program guide data to the means for selecting current program guide data; and

the continuous data stream distributed by the means for distributing is the continuous data stream provided by the means for providing a continuous data stream of current program guide data to the means for selecting current program guide data.

93. The system defined in claim 57 wherein the means for selecting current program guide data is configured to select current program guide data from programmer provided in-band information.

94. The system defined in claim 57 wherein the means for selecting current program guide data comprises means for localizing program guide data provided by a means for providing a continuous data stream of current program guide data and for selecting the current program guide data for inclusion in a continuous data stream from the program guide data that is localized by the means for selecting current program guide data.

95. The system defined in claim 57 wherein:

the means for selecting current program guide data is configured to select the current program guide data for inclusion in a plurality of continuous data streams wherein each continuous data stream of the plurality of continuous data streams carries current

program guide data for a particular program guide display screen;

the means for distributing comprises means for distributing the plurality of continuous data streams to the means for obtaining current program guide data and program guide data using the interactive television program guide; and

the means for obtaining current program guide data and program guide data using the interactive television program guide comprises means for obtaining current program guide data for a particular program guide display screen from the continuous data stream that carries current program guide data for that particular program guide display screen.

96. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

means for selecting one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream;

means for distributing the one or more unique identifiers selected by the means for selecting to the user television equipment in the continuous data stream; and

means using the interactive television program guide for obtaining the one or more unique identifiers selected by the means for selecting and for performing a real-time action when a particular unique identifier is in the continuous data stream.

97. The system defined in claim 96 wherein:
the real-time action comprises displaying a program reminder for a program; and
the means for performing a real-time action comprises means for displaying the program reminder for the program when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

98. The system defined in claim 96 wherein:
the real-time action comprises displaying a program reminder; and
the means for performing a real-time action comprises means for prefetching the current program guide data from the continuous data stream when the reminder is displayed by the means for performing a real-time action.

99. The system defined in claim 96 wherein:
the real-time action comprises authorizing the viewing of a pay-per-view program; and
the means for performing a real-time action comprises means for authorizing the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

100. The system defined in claim 96 wherein:
the real-time action comprises authorizing a viewing of a pay-per-view-program; and
the means for performing a real-time action comprises means for prefetching current program guide data from the continuous data stream when the

viewing of the pay-per-view program is authorized by the means for performing a real-time action.

101. The system defined in claim 96 wherein:

the real-time action comprises recording a program; and

the means for performing a real-time action comprises means for recording a program when a particular unique identifier is in the continuous data stream.

102. The system defined in claim 96 wherein:

the real-time action comprises locking a program and prompting a user for a control code; and

the means for performing a real-time action comprises means for locking a program and prompting the user for a control code when a particular identifier is in the continuous data stream.

103. The system defined in claim 96 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the means for performing a real-time action comprises means for displaying the program reminder for the program of a program grouping when a particular unique identifier is in the continuous data stream.

104. The system defined in claim 96 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the means for performing a real-time action comprises means for prefetching current program guide data from the continuous data stream when the reminder is displayed by the means for performing a real-time action.

105. The system defined in claim 96 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing the viewing of a pay-per-view program of a program grouping; and

the means for performing a real-time action comprises means for authorizing the viewing of a pay-per-view program of a program grouping when a particular unique identifier is in the continuous data stream.

106. The system defined in claim 96 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing a viewing of a pay-per-view-program of a program grouping; and

the means for performing a real-time action comprises means for prefetching current program guide data from the continuous data stream when the

viewing of the pay-per-view program of a program grouping is authorized by the means for performing a real-time action.

107. The system defined in claim 96 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises recording a program of a program grouping; and

the means for performing a real-time action comprises means for recording a program of a program grouping when a particular unique identifier is in the continuous data stream.

108. The system defined in claim 96 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises locking a program of a program grouping and prompting a user for a control code; and

the means for performing a real-time action comprises means for locking a program of a program grouping and prompting the user for a control code when a particular identifier is in the continuous data stream.

109. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is current program guide data and one or more unique identifiers, the system comprising:

means for selecting current program guide data and one or more of the one or more unique identifiers for inclusion in the continuous data stream;

means for distributing the current program guide data and one or more unique identifiers selected by the means for selecting in the continuous data stream to the user television equipment;

means for providing program guide data using a client-server based approach; and

means using the interactive television program guide to obtain:

one or more unique identifiers from the continuous data stream using the interactive television program guide;

current program guide data from a data stream and to store at least some of the current program guide data in a database stored in the user television equipment; and

program guide data from the means for providing in response to requests generated by the interactive television program guide.

110. The system defined in claim 109 wherein the means for obtaining comprises means for storing at least some of the program guide data in the database.

111. An interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

means for selecting one or more of the one or more unique identifiers for inclusion in a continuous data stream;

means for distributing the one or more unique identifiers selected by the means for selecting in the continuous data stream to the user television equipment;

means for providing program guide data using a client-server based approach; and

means for obtaining identifiers using the interactive television program guide from the continuous data stream and to obtain program guide data from the means for providing program guide data using a client-server based approach.

112. A method in an interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is current program guide data, the method comprising:

selecting current program guide data for inclusion in a continuous data stream using a continuous data stream processor;

distributing the selected current program guide data to the user television equipment in the continuous data stream;

providing program guide data using a program guide server; and

obtaining current program guide data from the continuous data stream and from the program guide server using the interactive television program guide implemented on the user television equipment in

response to requests generated by the interactive television program guide.

113. The method defined in claim 112 wherein:

the current program guide data comprises one or more unique identifiers; and

the method further comprises performing a real-time action using the interactive television program guide when a particular unique identifier is in the continuous data stream.

114. The method defined in claim 113 wherein:

the real-time action comprises displaying a program reminder for a program; and

the method further comprises using the interactive television program guide to display the program reminder for the program when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

115. The method defined in claim 113 wherein:

the real-time action comprises displaying a program reminder; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

116. The method defined in claim 113 wherein:

the real-time action comprises authorizing the viewing of a pay-per-view program; and

the method further comprises using the interactive television program guide to authorize the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

117. The method defined in claim 113 wherein:

the real-time action comprises authorizing a viewing of a pay-per-view-program; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data stream when the viewing of the pay-per-view program is authorized by the program guide.

118. The method defined in claim 113 wherein:

the real-time action comprises recording a program; and

the method further comprises using the interactive television program guide to record a program when a particular unique identifier is in the continuous data stream.

119. The method defined in claim 113 wherein:

the real-time action comprises locking a program and prompting a user for a control code; and

the method further comprises using the interactive television program guide to lock a program and prompt the user for a control code when a particular identifier is in the continuous data stream.

120. The method defined in claim 113 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the method further comprises using the interactive television program guide to display the program reminder for the program of a program grouping when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

121. The method defined in claim 113 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

122. The method defined in claim 113 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing the viewing of a pay-per-view program of a program grouping; and

the method further comprises using the interactive television program guide to authorize the viewing of a pay-per-view program of a program grouping when a particular unique identifier is in the continuous data stream.

123. The method defined in claim 113 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing a viewing of a pay-per-view-program of a program grouping; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data stream when the viewing of the pay-per-view program of a program grouping is authorized by the program guide.

124. The method defined in claim 113 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises recording a program of a program grouping; and

the method further comprises using the interactive television program guide to record a program of a program grouping when a particular unique identifier is in the continuous data stream.

125. The method defined in claim 113 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises locking a program of a program grouping and prompting a user for a control code; and

the method further comprises using the interactive television program guide to lock a program of a program grouping and prompt the user for a control code when a particular identifier is in the continuous data stream.

126. The method defined in claim 112 further comprising providing program guide data from the program guide server to the continuous data stream processor.

127. The method defined in claim 112 further comprising:

prioritizing the current program guide data; and

cycling the current program guide data in the continuous data stream according to how the current program listings data was prioritized.

128. The method defined in claim 112 further comprising processing the current program guide data in real-time and with no data caching using the interactive television program guide.

129. The method defined in claim 112 further comprising filtering current program guide data from the continuous data stream based on a tag.

130. The method defined in claim 112 further comprising prefetching current program guide data from the continuous data stream using the interactive television program guide.

131. The method defined in claim 112 further comprising prefetching program guide data from the program guide server using the interactive television program guide.

132. The method defined in claim 112 wherein:

obtaining current program guide data and program guide data comprises invoking a remote procedure call on the program guide server using the interactive television program guide; and

providing program guide data using a program guide server comprises providing program guide data in response to the remote procedure call being invoked on the program guide server.

133. The method defined in claim 112 wherein:

obtaining current program guide data and program guide data comprises using an object request broker to obtain program guide data from the program guide server; and

providing program guide data using a program guide server comprises providing program guide data using the object request broker.

134. The method defined in claim 112 wherein:

obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining configuration information from the program guide server using one or more requests; and

providing program guide data using a program guide server comprises storing configuration information and providing the configuration information to the interactive television program guide in response to the one or more requests.

135. The method defined in claim 112 wherein:

obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining user settings from the program guide server using one or more requests; and

providing program guide data using a program guide server comprises storing user settings and providing the user settings to the interactive television program guide in response to the one or more requests.

136. The method defined in claim 112 wherein:

the current program guide data has one or more types; and

obtaining current program guide data and program guide data using the interactive television program guide comprises recognizing the type of current program guide data carried in the continuous data stream and obtaining current program guide data from the continuous data stream when the current program guide data in the continuous data stream is a particular type.

137. The method defined in claim 112 wherein:

the current program guide data has one or more types; and

obtaining current program guide data and program guide data using the interactive television program guide comprises recognizing the type of current program guide data carried in the continuous data stream and obtaining program guide data from the program guide server when the current program guide

data in the continuous data stream is not a particular type.

138. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining program guide data for a program of a particular category from the program guide server.

139. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining current program guide data from the continuous data stream for a program of a particular category.

140. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises obtaining current program guide data from the continuous data stream when a user indicates a desire to flip channels.

141. The method defined in claim 112 wherein obtaining current program guide data and program guide data using the interactive television program guide comprises:

obtaining current program guide data from the continuous data stream when a user indicates a desire to browse program listings data in a current time slot; and

obtaining program guide data from the program guide server when the user indicates a desire

to browse program listings data in time slots other than the current time slot.

142. The method defined in claim 112 wherein:

the method further comprises providing program guide data from the program guide server to the continuous data stream processor; and

selecting current program guide data for inclusion in the continuous data stream comprises selecting current program guide data from the program guide data provided by the program guide server.

143. The system defined in claim 112 wherein:

the method further comprises continuously providing program guide data from the program guide server to the continuous data stream processor; and

selecting current program guide data for inclusion in the continuous data stream comprises selecting current program guide data from the program guide data provided by the program guide server.

144. The method defined in claim 112 wherein:

the method further comprises periodically providing program guide data from the program guide server to the continuous data stream processor; and

selecting current program guide data for inclusion in the continuous data stream comprises selecting current program data from the program guide data provided by the program guide server.

145. The method defined in claim 112 wherein:

the method further comprises polling the continuous data stream processor and providing program guide data from the program guide server to the continuous data stream processor; and

selecting current program guide data for inclusion in the continuous data stream comprises selecting current program data from the program guide data provided by the program guide server.

146. The method defined in claim 112 wherein:

the method further comprises:

providing program guide data from the program guide server to the continuous data stream processor in response to requests generated by the continuous data stream processor;

generating one or more requests for program guide data with the continuous data stream processor;

providing the one or more requests to the program guide server;

receiving program guide data from the program guide server; and

wherein selecting current program guide data for inclusion in the continuous data stream comprises selecting current program data from the program guide data provided by the program guide server.

147. The method defined in claim 112 wherein:

the method further comprises providing a continuous data stream of current program guide data from a main facility; and

distributing the continuous data stream comprises distributing the continuous data stream provided by the main facility.

148. The method defined in claim 112 wherein selecting current program guide data comprises selecting current program guide data from programmer provided in-band information.

149. The method defined in claim 112 further comprising localizing program guide data provided by a main facility using the continuous data stream processor; and

wherein selecting the current program guide data for inclusion in a continuous data stream comprises selecting current program guide data from program guide data that is localized by the continuous data stream processor.

150. The method defined in claim 112 wherein:

the method further comprises localizing program guide data provided by a main facility using the program guide server; and

wherein distributing current program guide data comprises distributing current program guide data that is localized by the program guide server.

151. The method defined in claim 112 wherein:

selecting program guide data comprises selecting current program guide data for inclusion in a plurality of continuous data streams wherein each continuous data stream of the plurality of continuous

data streams carries current program guide data for a particular program guide display screen;

distributing the current program guide data comprises distributing the plurality of continuous data streams to the user television equipment; and

the method further comprises obtaining current program guide data for a particular program guide display screen from the continuous data stream that carries current program guide data for that particular program guide display screen using the interactive television program guide.

152. A method in an interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is one or more unique identifiers, the system comprising:

selecting one or more unique identifiers of the one or more unique identifiers for inclusion in a continuous data stream using a continuous data stream processor;

distributing the one or more unique identifiers selected by the continuous data stream processor to the user television equipment in the continuous data stream;

obtaining the one or more unique identifiers selected by the continuous data stream processor using the interactive television program guide; and

performing a real-time action when a particular unique identifier is in the continuous data stream using the interactive television program guide.

153. The method defined in claim 152 wherein:

the real-time action comprises displaying a program reminder for a program; and

the method further comprises using the interactive television program guide to display the program reminder for the program when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

154. The method defined in claim 152 wherein:

the real-time action comprises displaying a program reminder; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

155. The method defined in claim 152 wherein:

the real-time action comprises authorizing the viewing of a pay-per-view program; and

the method further comprises using the interactive television program guide to authorize the viewing of a pay-per-view program when a particular unique identifier is in the continuous data stream.

156. The method defined in claim 152 wherein:

the real-time action comprises authorizing a viewing of a pay-per-view-program; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data

stream when the viewing of the pay-per-view program is authorized by the program guide.

157. The method defined in claim 152 wherein:

the real-time action comprises recording a program; and

the method further comprises using the interactive television program guide to record a program when a particular unique identifier is in the continuous data stream.

158. The method defined in claim 152 wherein:

the real-time action comprises locking a program and prompting a user for a control code; and

the method further comprises using the interactive television program guide to lock a program and prompt the user for a control code when a particular identifier is in the continuous data stream.

159. The method defined in claim 152 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the method further comprises using the interactive television program guide to display the program reminder for the program of a program grouping when a particular unique identifier of the one or more unique identifiers is in the continuous data stream.

160. The method defined in claim 152 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises displaying a program reminder for a program of a program grouping; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data stream when the reminder is displayed by the program guide.

161. The method defined in claim 152 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing the viewing of a pay-per-view program of a program grouping; and

the method further comprises using the interactive television program guide to authorize the viewing of a pay-per-view program of a program grouping when a particular unique identifier is in the continuous data stream.

162. The method defined in claim 152 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises authorizing a viewing of a pay-per-view-program of a program grouping; and

the method further comprises using the interactive television program guide to prefetch current program guide data from the continuous data

stream when the viewing of the pay-per-view program of a program grouping is authorized by the program guide.

163. The method defined in claim 152 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises recording a program of a program grouping; and

the method further comprises using the interactive television program guide to record a program of a program grouping when a particular unique identifier is in the continuous data stream.

164. The method defined in claim 152 wherein:

one or more of the one or more unique identifiers is a program grouping identifier;

the real-time action comprises locking a program of a program grouping and prompting a user for a control code; and

the method further comprises using the interactive television program guide to lock a program of a program grouping and prompt the user for a control code when a particular identifier is in the continuous data stream.

165. A method in an interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is current program guide data and one or more unique identifiers, the method comprising:

selecting current program guide data and one or more of the one or more unique identifiers for inclusion in the continuous data stream;

distributing the selected current program guide data and one or more unique identifiers in the continuous data stream to the user television equipment;

providing program guide data using a program guide server; and

using the interactive television program guide to obtain:

one or more unique identifiers from the continuous data stream using the interactive television program guide;

current program guide data from the continuous data stream and to store at least some of the current program guide data in a database stored in the user television equipment; and

program guide data from the program guide server in response to requests generated by the interactive television program guide.

166. The method defined in claim 165 further comprising storing at least some of the program guide data in the database.

167. A method in an interactive television program guide system in which program guide data is provided to an interactive television program guide implemented on user television equipment and wherein at least some of the program guide data is one or more unique identifiers, the method comprising:

selecting one or more of the one or more unique identifiers for inclusion in a continuous data stream;

distributing the selected one or more unique identifiers in the continuous data stream to the user television equipment;

providing program guide data using a program guide server; and

obtaining identifiers from the continuous data stream and obtaining program guide data from the program guide server using the interactive television program guide.

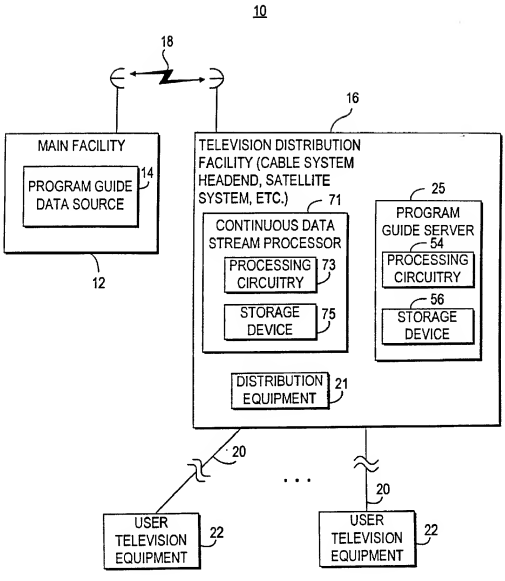
10
18
16
MAIN FACILITY
PROGRAM GUIDE DATA SOURCE
14
12
TELEVISION DISTRIBUTION FACILITY (CABLE SYSTEM HEADEND, SATELLITE SYSTEM, ETC.)
71
CONTINUOUS DATA STREAM PROCESSOR
PROCESSING CIRCUITRY
73
STORAGE DEVICE
75
25
PROGRAM GUIDE SERVER
54
PROCESSING CIRCUITRY
56
STORAGE DEVICE
DISTRIBUTION EQUIPMENT
21
20
20
USER TELEVISION EQUIPMENT
22
USER TELEVISION EQUIPMENT
22

FIG. 1

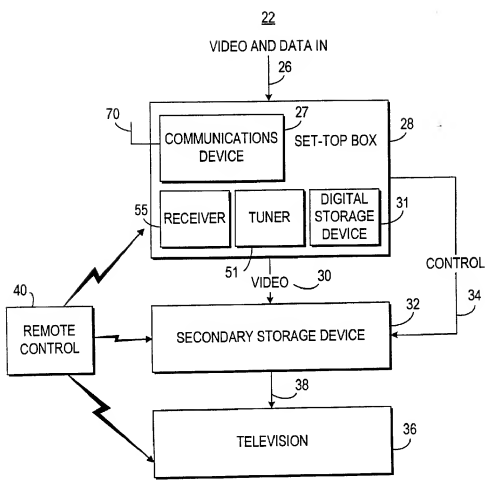
22
VIDEO AND DATA IN
26
70
27
COMMUNICATIONS DEVICE
SET-TOP BOX
28
55
RECEIVER
TUNER
DIGITAL STORAGE DEVICE
31
CONTROL
51
VIDEO
30
40
REMOTE CONTROL
32
34
SECONDARY STORAGE DEVICE
38
TELEVISION
36

FIG. 2

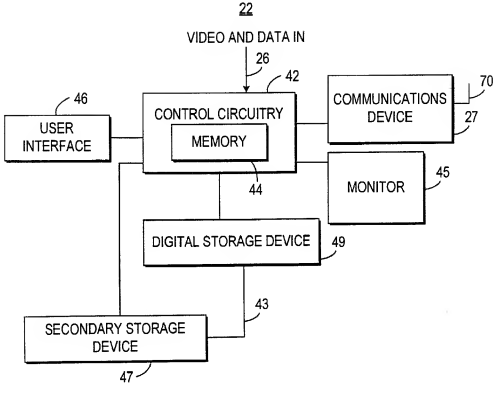
22
VIDEO AND DATA IN
26
42
70
46
CONTROL CIRCUITRY
COMMUNICATIONS DEVICE
USER INTERFACE
MEMORY
27
44
MONITOR
45
DIGITAL STORAGE DEVICE
49
43
SECONDARY STORAGE DEVICE
47

FIG. 3

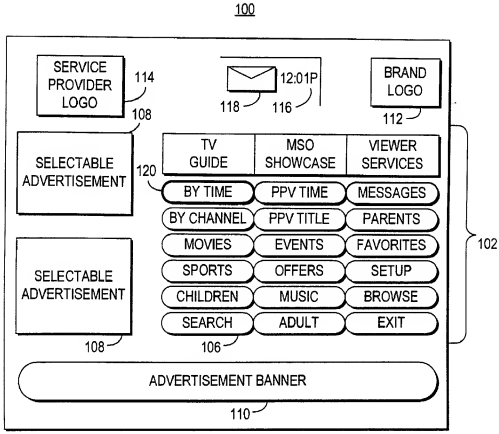
100
SERVICE PROVIDER LOGO
114
108
12:01P
118
116
BRAND LOGO
112
SELECTABLE ADVERTISEMENT
120
TV GUIDE
MSO SHOWCASE
VIEWER SERVICES
BY TIME
PPV TIME
MESSAGES
BY CHANNEL
PPV TITLE
PARENTS
MOVIES
EVENTS
FAVORITES
SPORTS
OFFERS
SETUP
CHILDREN
MUSIC
BROWSE
SEARCH
ADULT
EXIT
102
SELECTABLE ADVERTISEMENT
108
106
ADVERTISEMENT BANNER
110

FIG. 4

130

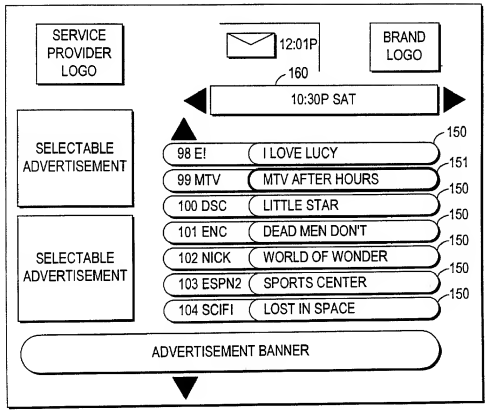
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
10:30P SAT
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
150
98 E! I LOVE LUCY
151
99 MTV MTV AFTER HOURS
150
100 DSC LITTLE STAR
150
101 ENC DEAD MEN DON'T
150
102 NICK WORLD OF WONDER
150
103 ESPN2 SPORTS CENTER
150
104 SCIFI LOST IN SPACE
ADVERTISEMENT BANNER

FIG. 5a

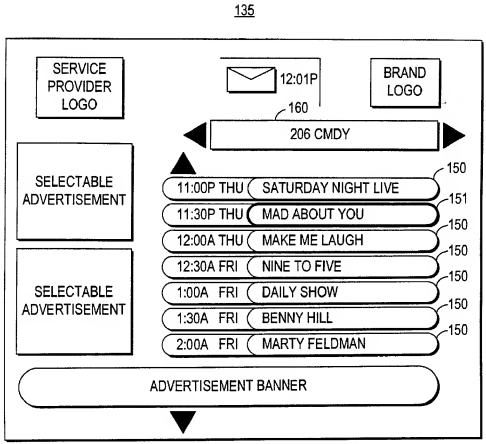
135
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
206 CMDY
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
11:00P THU SATURDAY NIGHT LIVE
11:30P THU MAD ABOUT YOU
12:00A THU MAKE ME LAUGH
12:30A FRI NINE TO FIVE
1:00A FRI DAILY SHOW
1:30A FRI BENNY HILL
2:00A FRI MARTY FELDMAN
150
151
150
150
150
150
150
ADVERTISEMENT BANNER

FIG. 5b

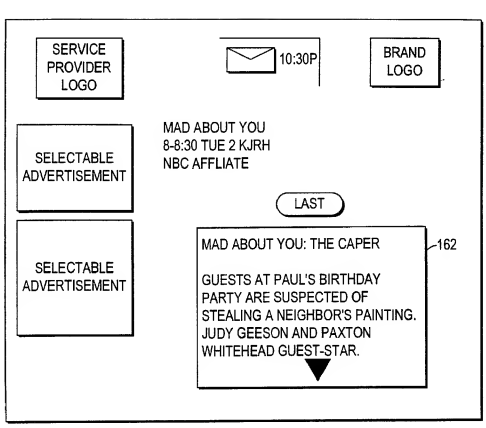
161
SERVICE PROVIDER LOGO
10:30P
BRAND LOGO
SELECTABLE ADVERTISEMENT
MAD ABOUT YOU
8-8:30 TUE 2 KJRH
NBC AFFLIATE
LAST
SELECTABLE ADVERTISEMENT
MAD ABOUT YOU: THE CAPER
GUESTS AT PAUL'S BIRTHDAY PARTY ARE SUSPECTED OF STEALING A NEIGHBOR'S PAINTING. JUDY GEESON AND PAXTON WHITEHEAD GUEST-STAR.
162

FIG. 6

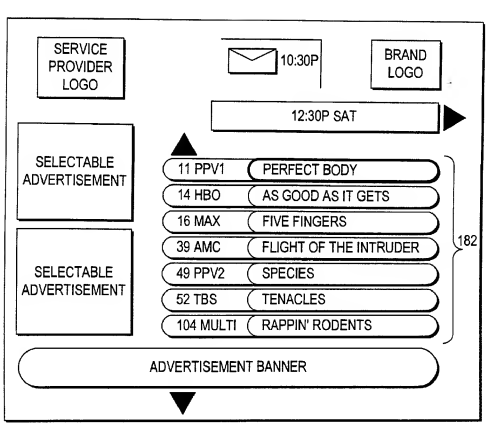
180
SERVICE PROVIDER LOGO
10:30P
BRAND LOGO
12:30P SAT
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
11 PPV1 PERFECT BODY
14 HBO AS GOOD AS IT GETS
16 MAX FIVE FINGERS
39 AMC FLIGHT OF THE INTRUDER
49 PPV2 SPECIES
52 TBS TENACLES
104 MULTI RAPPIN' RODENTS
182
ADVERTISEMENT BANNER

FIG. 7

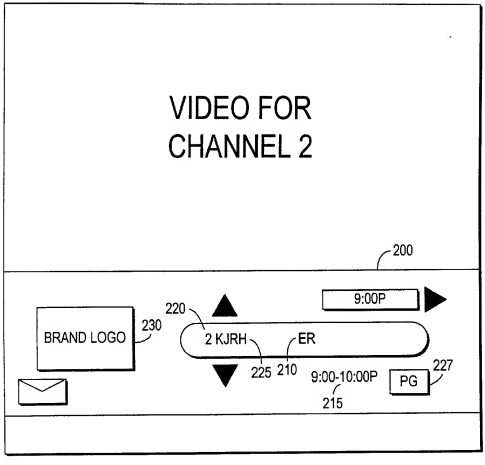
VIDEO FOR
CHANNEL 2
200
9:00P
220
BRAND LOGO
230
2 KJRH
ER
225
210
9:00-10:00P
215
PG
227

FIG. 8a

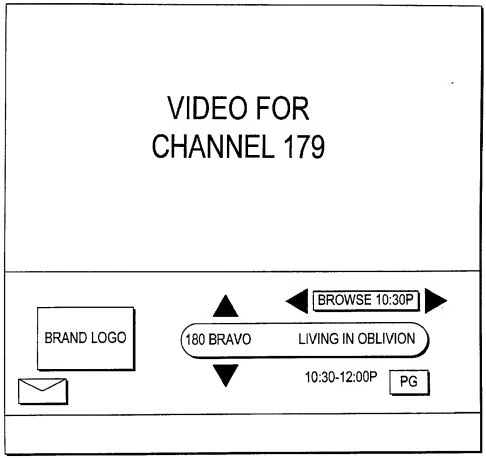
VIDEO FOR
CHANNEL 179
BROWSE 10:30P
BRAND LOGO
180 BRAVO
LIVING IN OBLIVION
10:30-12:00P
PG

FIG. 8b

300

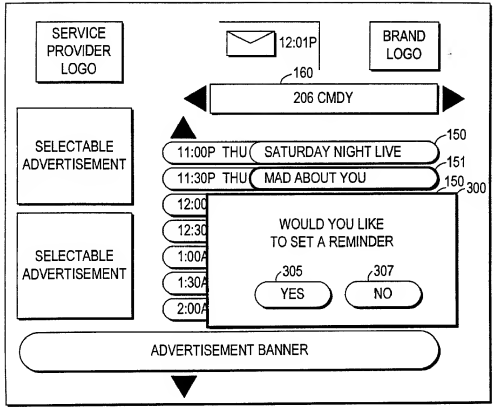
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
206 CMDY
SELECTABLE ADVERTISEMENT
11:00P THU
SATURDAY NIGHT LIVE
150
11:30P THU
MAD ABOUT YOU
151
150
300
12:00
12:30
1:00A
1:30A
2:00A
WOULD YOU LIKE TO SET A REMINDER
305
307
YES
NO
SELECTABLE ADVERTISEMENT
ADVERTISEMENT BANNER

FIG. 9a

310

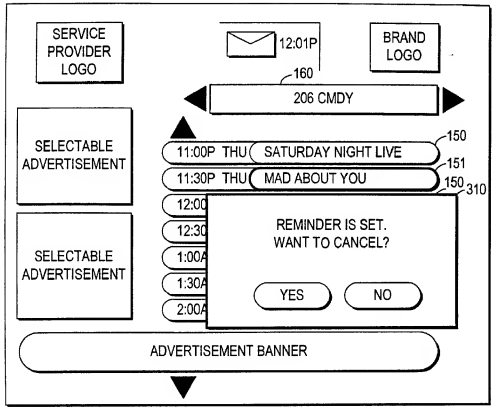
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
206 CMDY
SELECTABLE ADVERTISEMENT
11:00P THU
SATURDAY NIGHT LIVE
150
11:30P THU
MAD ABOUT YOU
151
150
310
12:00
12:30
1:00A
1:30A
2:00A
REMINDER IS SET.
WANT TO CANCEL?
YES
NO
SELECTABLE ADVERTISEMENT
ADVERTISEMENT BANNER

FIG. 9b

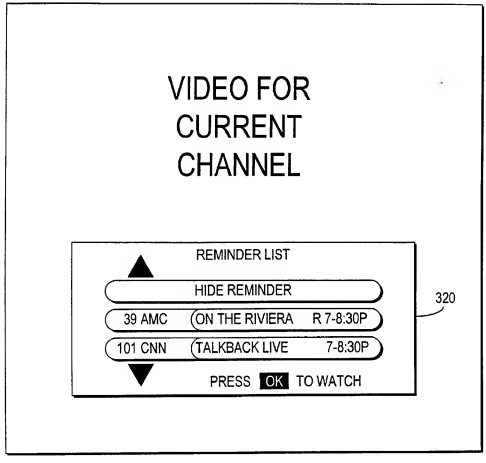
VIDEO FOR
CURRENT
CHANNEL
REMINDER LIST
HIDE REMINDER
39 AMC
ON THE RIVIERA
R 7-8:30P
101 CNN
TALKBACK LIVE
7-8:30P
PRESS OK TO WATCH
320

FIG. 10a

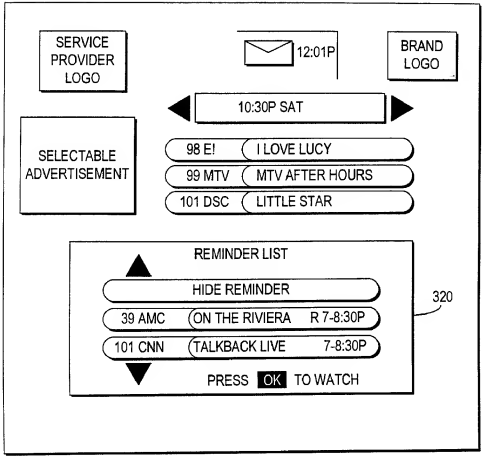
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
10:30P SAT
SELECTABLE ADVERTISEMENT
98 E! I LOVE LUCY
99 MTV MTV AFTER HOURS
101 DSC LITTLE STAR
REMINDER LIST
HIDE REMINDER
39 AMC ON THE RIVIERA R 7-8:30P
101 CNN TALKBACK LIVE 7-8:30P
PRESS OK TO WATCH
320

FIG. 10b

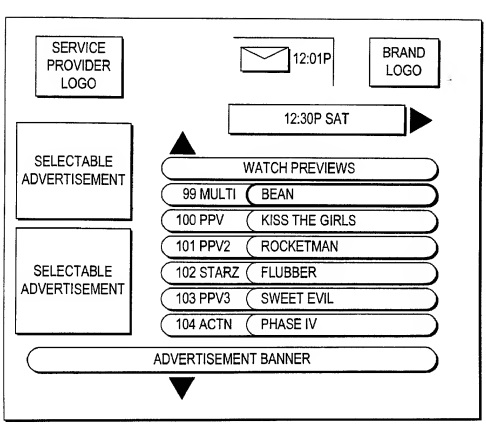
350
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
12:30P SAT
SELECTABLE ADVERTISEMENT
SELECTABLE ADVERTISEMENT
WATCH PREVIEWS
99 MULTI BEAN
100 PPV KISS THE GIRLS
101 PPV2 ROCKETMAN
102 STARZ FLUBBER
103 PPV3 SWEET EVIL
104 ACTN PHASE IV
ADVERTISEMENT BANNER

FIG. 11a

370

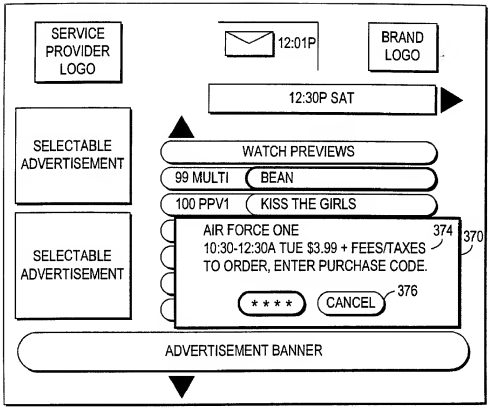
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
12:30P SAT
SELECTABLE ADVERTISEMENT
WATCH PREVIEWS
99 MULTI
BEAN
100 PPV1
KISS THE GIRLS
AIR FORCE ONE
10:30-12:30A TUE $3.99 + FEES/TAXES
TO ORDER, ENTER PURCHASE CODE.
374
370
SELECTABLE ADVERTISEMENT
* * * *
CANCEL
376
ADVERTISEMENT BANNER

FIG. 11b

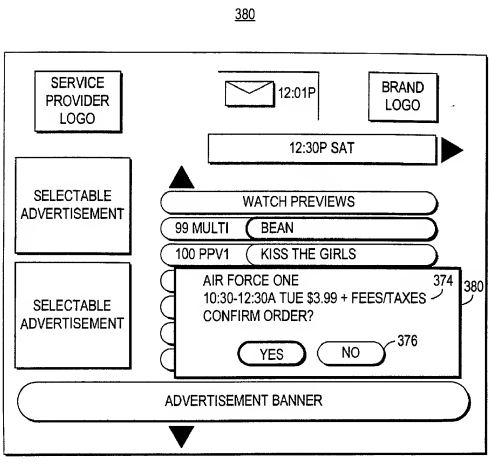
380
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
12:30P SAT
SELECTABLE ADVERTISEMENT
WATCH PREVIEWS
99 MULTI
BEAN
100 PPV1
KISS THE GIRLS
SELECTABLE ADVERTISEMENT
AIR FORCE ONE
10:30-12:30A TUE $3.99 + FEES/TAXES
CONFIRM ORDER?
374
380
YES
NO
376
ADVERTISEMENT BANNER

FIG. 11c

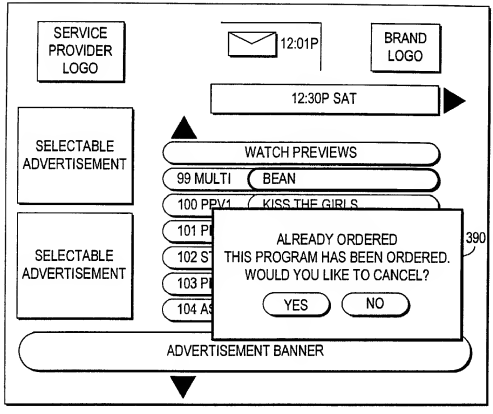
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
12:30P SAT
SELECTABLE ADVERTISEMENT
WATCH PREVIEWS
99 MULTI
BEAN
100 PPV1
KISS THE GIRLS
101 PI
102 ST
103 PI
104 AS
SELECTABLE ADVERTISEMENT
ALREADY ORDERED
THIS PROGRAM HAS BEEN ORDERED.
WOULD YOU LIKE TO CANCEL?
YES
NO
390
ADVERTISEMENT BANNER

FIG. 11d

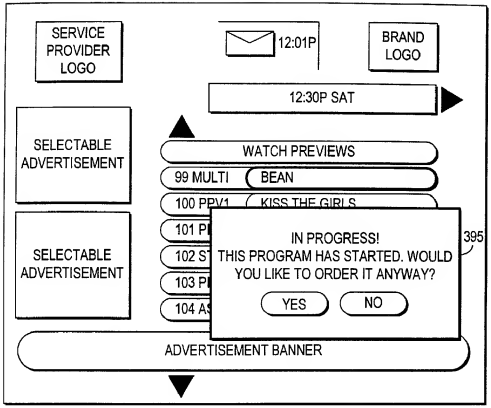
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
12:30P SAT
SELECTABLE ADVERTISEMENT
WATCH PREVIEWS
99 MULTI
BEAN
100 PPV1
KISS THE GIRLS
101 P
102 S
103 P
104 A
SELECTABLE ADVERTISEMENT
IN PROGRESS!
THIS PROGRAM HAS STARTED. WOULD YOU LIKE TO ORDER IT ANYWAY?
YES
NO
395
ADVERTISEMENT BANNER

FIG. 11e

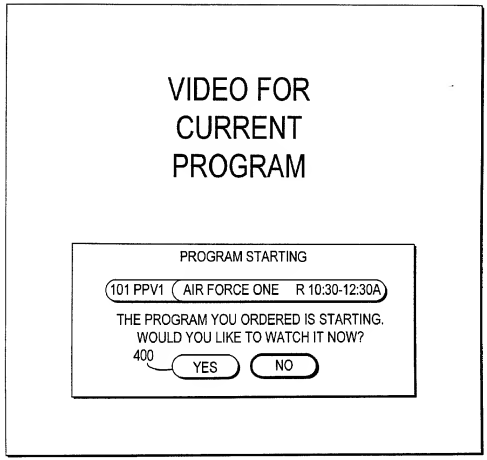
VIDEO FOR
CURRENT
PROGRAM
PROGRAM STARTING
101 PPV1 AIR FORCE ONE R 10:30-12:30A
THE PROGRAM YOU ORDERED IS STARTING.
WOULD YOU LIKE TO WATCH IT NOW?
400
YES
NO

FIG. 12a

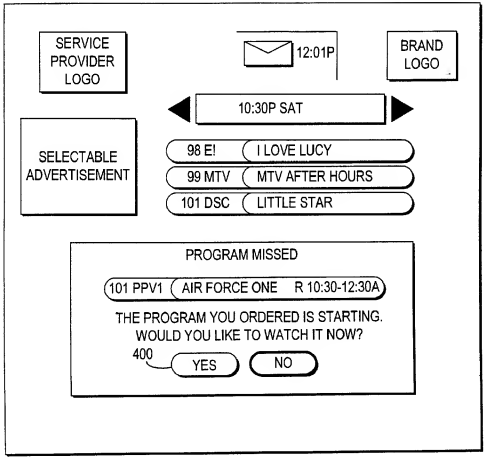
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
10:30P SAT
SELECTABLE ADVERTISEMENT
98 E! I LOVE LUCY
99 MTV MTV AFTER HOURS
101 DSC LITTLE STAR
PROGRAM MISSED
101 PPV1 AIR FORCE ONE R 10:30-12:30A
THE PROGRAM YOU ORDERED IS STARTING.
WOULD YOU LIKE TO WATCH IT NOW?
400
YES
NO

FIG. 12b

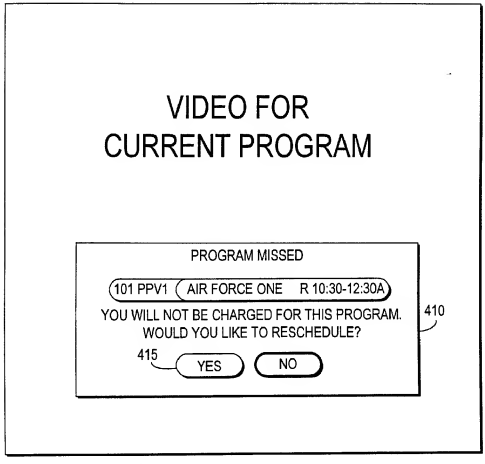
VIDEO FOR
CURRENT PROGRAM
PROGRAM MISSED
101 PPV1 AIR FORCE ONE R 10:30-12:30A
YOU WILL NOT BE CHARGED FOR THIS PROGRAM.
WOULD YOU LIKE TO RESCHEDULE?
410
415
YES
NO

FIG. 13a

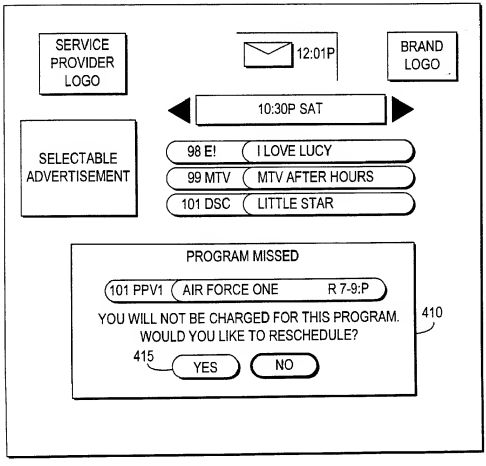
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
10:30P SAT
SELECTABLE ADVERTISEMENT
98 E! I LOVE LUCY
99 MTV MTV AFTER HOURS
101 DSC LITTLE STAR
PROGRAM MISSED
101 PPV1 AIR FORCE ONE R 7-9:P
YOU WILL NOT BE CHARGED FOR THIS PROGRAM.
WOULD YOU LIKE TO RESCHEDULE?
410
415
YES
NO

FIG. 13b

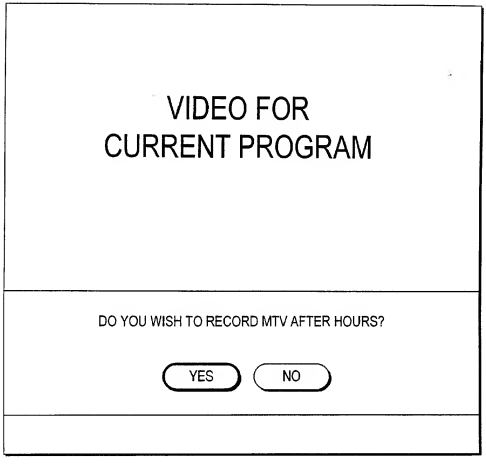
VIDEO FOR
CURRENT PROGRAM
DO YOU WISH TO RECORD MTV AFTER HOURS?
YES
NO

FIG. 14a

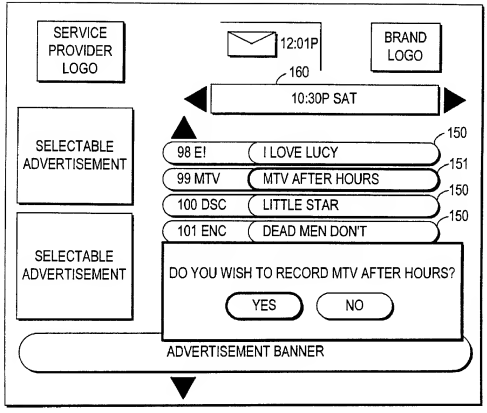
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
160
10:30P SAT
SELECTABLE ADVERTISEMENT
150
98 E!
I LOVE LUCY
151
99 MTV
MTV AFTER HOURS
150
100 DSC
LITTLE STAR
150
101 ENC
DEAD MEN DON'T
SELECTABLE ADVERTISEMENT
DO YOU WISH TO RECORD MTV AFTER HOURS?
YES
NO
ADVERTISEMENT BANNER

FIG. 14b

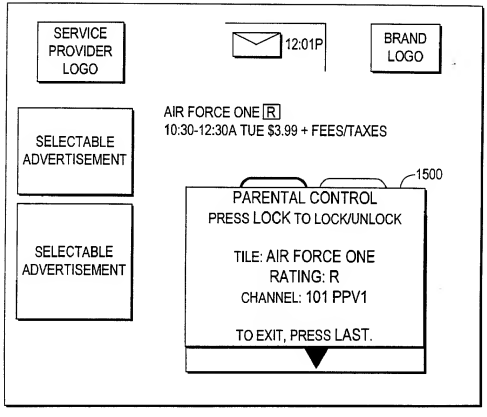
SERVICE PROVIDER LOGO
12:01P
BRAND LOGO
SELECTABLE ADVERTISEMENT
AIR FORCE ONE R
10:30-12:30A TUE $3.99 + FEES/TAXES
SELECTABLE ADVERTISEMENT
1500
PARENTAL CONTROL
PRESS LOCK TO LOCK/UNLOCK
TILE: AIR FORCE ONE
RATING: R
CHANNEL: 101 PPV1
TO EXIT, PRESS LAST.

FIG. 15a

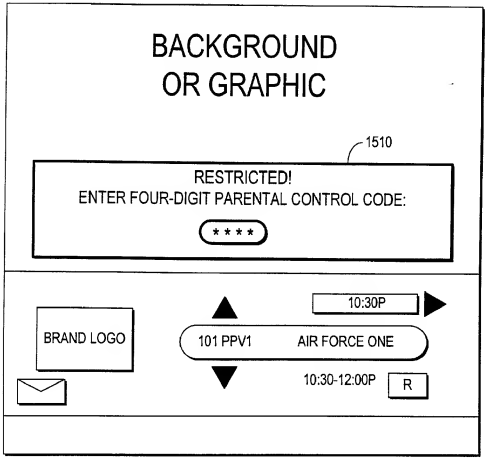
BACKGROUND
OR GRAPHIC
1510
RESTRICTED!
ENTER FOUR-DIGIT PARENTAL CONTROL CODE:
****
10:30P
BRAND LOGO
101 PPV1
AIR FORCE ONE
10:30-12:00P
R

FIG. 15b

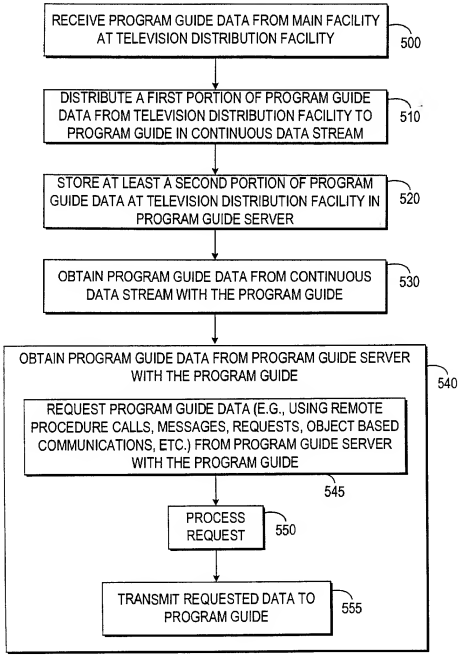
RECEIVE PROGRAM GUIDE DATA FROM MAIN FACILITY AT TELEVISION DISTRIBUTION FACILITY
500
DISTRIBUTE A FIRST PORTION OF PROGRAM GUIDE DATA FROM TELEVISION DISTRIBUTION FACILITY TO PROGRAM GUIDE IN CONTINUOUS DATA STREAM
510
STORE AT LEAST A SECOND PORTION OF PROGRAM GUIDE DATA AT TELEVISION DISTRIBUTION FACILITY IN PROGRAM GUIDE SERVER
520
OBTAIN PROGRAM GUIDE DATA FROM CONTINUOUS DATA STREAM WITH THE PROGRAM GUIDE
530
OBTAIN PROGRAM GUIDE DATA FROM PROGRAM GUIDE SERVER WITH THE PROGRAM GUIDE
540
REQUEST PROGRAM GUIDE DATA (E.G., USING REMOTE PROCEDURE CALLS, MESSAGES, REQUESTS, OBJECT BASED COMMUNICATIONS, ETC.) FROM PROGRAM GUIDE SERVER WITH THE PROGRAM GUIDE
545
PROCESS REQUEST
550
TRANSMIT REQUESTED DATA TO PROGRAM GUIDE
555

FIG. 16

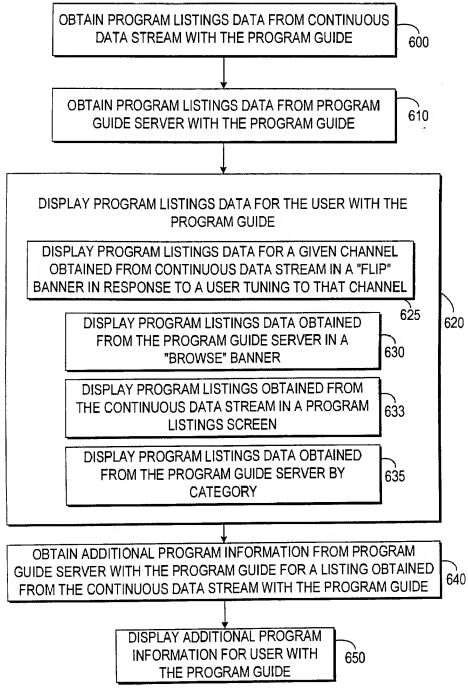
OBTAIN PROGRAM LISTINGS DATA FROM CONTINUOUS DATA STREAM WITH THE PROGRAM GUIDE
600
OBTAIN PROGRAM LISTINGS DATA FROM PROGRAM GUIDE SERVER WITH THE PROGRAM GUIDE
610
DISPLAY PROGRAM LISTINGS DATA FOR THE USER WITH THE PROGRAM GUIDE
DISPLAY PROGRAM LISTINGS DATA FOR A GIVEN CHANNEL OBTAINED FROM CONTINUOUS DATA STREAM IN A "FLIP" BANNER IN RESPONSE TO A USER TUNING TO THAT CHANNEL
625
DISPLAY PROGRAM LISTINGS DATA OBTAINED FROM THE PROGRAM GUIDE SERVER IN A "BROWSE" BANNER
630
DISPLAY PROGRAM LISTINGS OBTAINED FROM THE CONTINUOUS DATA STREAM IN A PROGRAM LISTINGS SCREEN
633
DISPLAY PROGRAM LISTINGS DATA OBTAINED FROM THE PROGRAM GUIDE SERVER BY CATEGORY
635
620
OBTAIN ADDITIONAL PROGRAM INFORMATION FROM PROGRAM GUIDE SERVER WITH THE PROGRAM GUIDE FOR A LISTING OBTAINED FROM THE CONTINUOUS DATA STREAM WITH THE PROGRAM GUIDE
640
DISPLAY ADDITIONAL PROGRAM INFORMATION FOR USER WITH THE PROGRAM GUIDE
650

FIG. 17

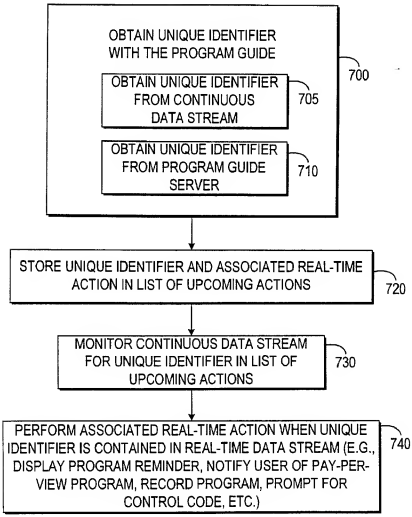
OBTAIN UNIQUE IDENTIFIER WITH THE PROGRAM GUIDE
700
OBTAIN UNIQUE IDENTIFIER FROM CONTINUOUS DATA STREAM
705
OBTAIN UNIQUE IDENTIFIER FROM PROGRAM GUIDE SERVER
710
STORE UNIQUE IDENTIFIER AND ASSOCIATED REAL-TIME ACTION IN LIST OF UPCOMING ACTIONS
720
MONITOR CONTINUOUS DATA STREAM FOR UNIQUE IDENTIFIER IN LIST OF UPCOMING ACTIONS
730
PERFORM ASSOCIATED REAL-TIME ACTION WHEN UNIQUE IDENTIFIER IS CONTAINED IN REAL-TIME DATA STREAM (E.G., DISPLAY PROGRAM REMINDER, NOTIFY USER OF PAY-PER-VIEW PROGRAM, RECORD PROGRAM, PROMPT FOR CONTROL CODE, ETC.)
740

FIG. 18

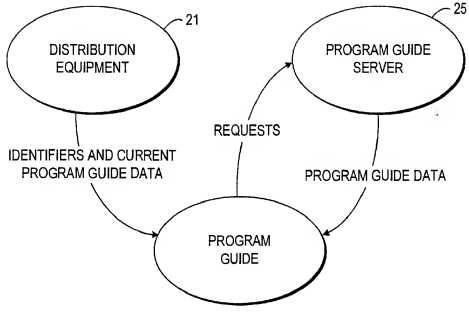

FIG. 19a

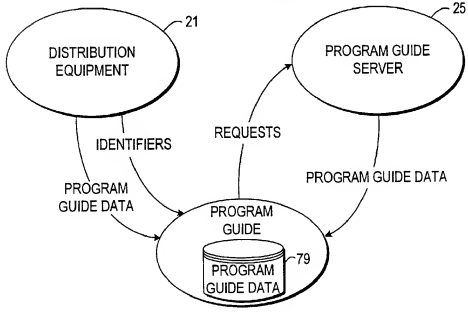

FIG. 19b

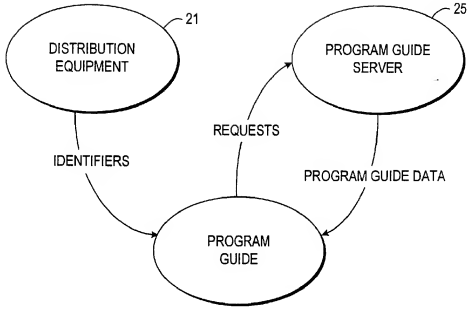
21
DISTRIBUTION EQUIPMENT
25
PROGRAM GUIDE SERVER
REQUESTS
IDENTIFIERS
PROGRAM GUIDE DATA
PROGRAM GUIDE

FIG. 19c

INTERNATIONAL SEARCH REPORT

Int ional Application No
PCT/US 99/25485

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04N7/173 H04N5/445

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04N

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 98 26528 A (ADDINGTON TIMOTHY H ;DEFREESE DARRYL L (US); SCIENTIFIC ATLANTA (U) 18 June 1998 (1998-06-18)	1,15-23, 25-28, 31-40, 54-57, 71-79, 81-84, 87-95, 109-112, 126-134, 136-139, 142-151, 165-167
Y	page 4 -page 9	2-14,24, 29,30, 41-53, 58-70, 80,85, 86, 96-108,
	-/--	

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

* Special categories of cited documents :

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"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 March 2000	17/03/2000

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL – 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Yvonnet, J

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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	page 14, line 23 -page 17, line 7 page 19, line 8 -page 24, line 11; figures 4,8,9	
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PCT/US 99/25485

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information on patent family members

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